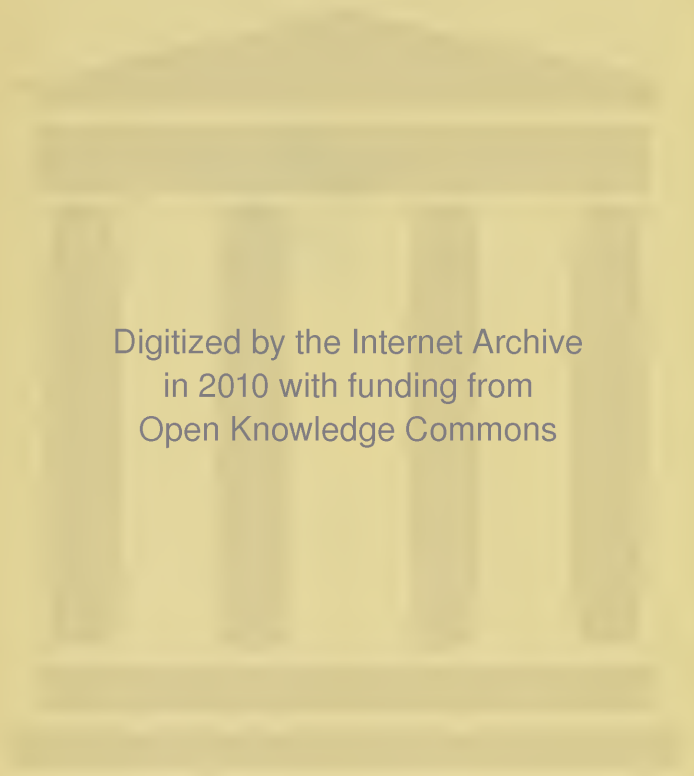


COLUMBIA
UNIVERSITY
WITHDRAWN
HSL

COLUMBIA
UNIVERSITY
WITHDRAWN
HSL



Digitized by the Internet Archive
in 2010 with funding from
Open Knowledge Commons

COLUMBIA UNIVERSITY BULLETIN OF INFORMATION

Fifty-sixth Series, No. 44

November 3, 1956

Report of the Dean of the Faculty of Medicine

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1956



COLUMBIA-PRESBYTERIAN MEDICAL CENTER
168TH STREET AND BROADWAY
NEW YORK 32, NEW YORK

Columbia University Bulletin of Information

Fifty-sixth Series, No. 44

November 3, 1956

Issued at Columbia University, Morningside Heights, New York 27, N.Y., weekly from January for forty-six consecutive issues. Reentered as second-class matter, August 15, 1952, at the Post Office at New York, N.Y., under the act of August 24, 1912. Acceptance for mailing at a special rate of postage provided for in Section 1103, Act of October 3, 1917, authorized.

The series includes the report of the President to the Trustees and the announcements of the several colleges and schools relating to the work of the next year. These are made as accurate as possible, but the right is reserved to make changes in detail as circumstances require. The current number of any of these announcements will be sent upon written application to the Office of University Admissions, 322 University Hall, Columbia University, New York 27, N.Y. Copies may be obtained in person from the Office of the Secretary, 213 Low Memorial Library.

C. U. P.—1,900—1956

Serial
C
Spec-Gen
14-64

FACULTY OF MEDICINE

REPORT OF THE DEAN

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1956

The registration of the School of Medicine was as follows:

First year	119
Second year	111
Third year	114
Fourth year	<u>118</u>
TOTAL	462

Residents from forty-five states, the District of Columbia, and twenty-six foreign countries, totaling 1,614 students from 274 colleges, applied for admission to the first-year class entering in September, 1956. The 120 accepted students received their liberal arts education in forty-three different colleges and came from twenty-six states and five foreign countries.

The registration of the School of Dental and Oral Surgery was as follows:

First year	40
Second year	44
Third year	33
Fourth year	<u>33</u>
TOTAL	150

During the year there were seventy students registered for non-credit postgraduate courses in the Dental School and forty-four students registered for postgraduate credit courses. A class of thirty-two students was enrolled in the Courses for Dental Hygienists; seventeen received the Bachelor of Science degree and one student was awarded the Master of Science degree.

In the School of Public Health and Administrative Medicine the registration was as follows:

D.P.H. candidates	3
M.P.H. candidates	29
M.S. candidates	<u>69</u>
TOTAL	101

The registration in the Department of Nursing was as follows:

First year	102
Second year	112
Third year	<u>132</u>
TOTAL	346

During the past year there were 592 students from twenty-three affiliated schools of nursing who received instruction under the Department of Nursing in various hospital and laboratory units of the Medical Center.

In the Course for Occupational Therapists thirty-nine students were registered, and in the Course for Physical Therapists, fifty-five students.

The following degrees were awarded during the year:

M.D.	118
Med.Sc.D.	2
D.D.S.	33
D.P.H.	1
M.P.H.	18
M.S. (Dental, Nursing, and Public Health fields)	41
B.S. (Nursing, Occupational Therapy, Physical Therapy, Dental Hygiene)	124

In addition to the students enrolled under the Faculty of Medicine there were approximately ninety students registered under the Graduate Faculties of the University who took courses and advanced research work in the departments of the Medical School.

The preceding figures indicate that the Faculty of Medicine is responsible for the instruction of many more students, graduate and undergraduate, than is commonly known. The total of medical, graduate, postgraduate, nursing, occupational therapy, physical therapy, dental, dental hygiene, and public health students, visiting scholars, fellows, hospital residents, and younger staff members runs to over three thousand full-time and part-time students.

It is gratifying to report that during the academic year ninety-six medical students received scholarships averaging about \$480 per student.

It is with the greatest sorrow that we report the following deaths during the year:

Axel L. Hanson, Instructor in Dental Technic, on January 16, 1956
Arnold Knapp, Professor Emeritus of Ophthalmology, on February 29, 1956
Charles C. Lieb, Hosack Professor Emeritus of Pharmacology, on April 6, 1956
Laszlo L. Reiner, Research Associate in Medicine, on November 27, 1955
Elias Schneider, Research Assistant in Psychiatry, on June 30, 1955
Franklin A. Stevens, Associate in Medicine, on June 20, 1956
Kenneth B. Turner, Associate Professor of Clinical Medicine, on October 9, 1955
Horatio B. Williams, Dalton Professor Emeritus of Physiology, on November 1, 1955

The following retirements are reported, each of whom received emeritus designations by the Trustees:

Hans T. Clarke, Professor of Biochemistry and Executive Officer of the Department of Biochemistry, effective June 30, 1956
Alan DeForest Smith, Professor of Orthopedic Surgery and Executive Officer of the Department of Orthopedic Surgery, effective June 30, 1956
Michael Heidelberger, Professor of Immunochemistry, effective June 30, 1956
Joseph Schroff, William Carr Professor of Oral Surgery, effective June 30, 1956

At the end of the year Professor Hans T. Clarke retired as executive officer of the Department of Biochemistry. Under his leadership the department has become one of the most eminent in this country. His collaboration with every division of the entire School and in the affiliated hospitals has placed biochemistry here on a broad, constructive basis. His inspiration will be greatly missed but we are happy that one of his outstanding students, Dr. David Rittenberg, will continue to carry on the program and the tradition now so firmly established.

Professor Alan DeForest Smith, executive officer of the Department of Orthopedic Surgery and director of the corresponding service in Presbyterian Hospital, retired after a long career in his specialty, first at the New York Orthopedic Dispensary and Hospital and later, after transfer to Presbyterian Hospital, in the new facilities at the Medical Center. His ability and reputation brought large numbers of graduate students to the institution. His many contributions will serve as a fitting monument to his noteworthy career. Dr. Smith will be succeeded by

Dr. Frank Stinchfield, one of the ablest and most promising members of the staff.

The following designations were made, effective July 1, 1956:

David Rittenberg, Executive Officer of the Department of Biochemistry
Frank E. Stinchfield, Professor of Orthopedic Surgery and Executive Officer of the Department of Orthopedic Surgery

The following promotions were made, effective July 1, 1956:

William R. Brumfield, Associate Professor of Public Health Practice
Louis J. Cizek, Associate Professor of Physiology
Joseph A. Cuttita, Associate Professor of Dental and Oral Surgery
Morris Greenberg, Associate Professor of Epidemiology
Cushman D. Haagensen, Professor of Clinical Surgery
Paul H. Hoch, Professor of Clinical Psychiatry
Tiffany Lawyer, Jr., Professor of Clinical Neurology
William L. Nastuk, Associate Professor of Physiology
Albert A. Plentl, Associate Professor of Obstetrics and Gynecology
Leon Roizin, Associate Professor of Neuropathology
Daniel Sciarra, Associate Professor of Clinical Neurology
David M. Spain, Associate Professor of Pathology
Irwin B. Wilson, Associate Professor of Biochemistry
Stephen Zamenhof, Associate Professor of Biochemistry
Joseph Zubin, Professor of Psychology (Biometrics)

The following new appointments were made:

Gilbert J. Vosburgh, Associate Professor of Obstetrics and Gynecology, from October 1, 1955
Barbara W. Low, Associate Professor of Biochemistry, from July 1, 1956
William B. Seaman, Professor of Radiology and Executive Officer of the Department of Radiology, from September 16, 1956

The Janeway Prize, awarded to the graduate who, in the opinion of the faculty, has ranked highest in efficiency and ability, was given to Hans Baruch. The Borden Undergraduate Research Award was given to Edgar Haber and Kurt W. Kohn for outstanding research work during the medical course. The Joseph Mather Smith Prize, awarded to the graduate whose essay or original research in medical subjects is deemed by the Committee on Award to be the most meritorious, was

given to Dr. Wallace Epstein, Class of 1952. The Coakley Memorial Prize was awarded to John C. Rathe. The Dr. William Perry Watson Prize in pediatrics was given to Jerry C. Jacobs. The Van Woert Scholarship Prize was given to Robert S. Klotz. The Operative Division Prize was received by Thomas W. Portway.

Martin Mendelsohn was given the Alpha Omega Fraternity Award. The Ella Marie Ewell Certificate and Medal in dentistry were given to Abe Meisner. The Rowe-Wiberg Medal was given to Richard B. Feinstein. James D. Finkelstein was given the Frederick Parker Gay Memorial Award. The Joseph Garrison Parker Award was given to Byron Hardin. The Psi Omega Fraternity Award and the Certificate for Excellence in Pedodontics, awarded by the Class of 1929, were given to Robert L. Eagle.

THE GRADUATE AND POSTGRADUATE PROGRAM

The graduate training built around the residencies in affiliated hospitals continues at the same level as heretofore, but with a noticeable increase in the amount of investigative work being conducted by some of the house officers. There were 436 physicians enrolled in fifty-four courses. Twenty-six residents in affiliated hospitals were registered in special basic science courses. Collaboration between the clinical departments and the basic sciences, when possible, has contributed much to the strengthening of this program on a rather informal basis.

We have maintained the postgraduate courses offered to the practitioners in this area and throughout the country; they have been given for the most part in the affiliated hospitals, particularly in Mount Sinai and Montefiore. There has been a nationwide increase of postgraduate courses conducted under other than university auspices but often in collaboration with them. This represents a shift in the pattern of postgraduate training in which we, like other university medical schools, are cooperating.

STUDENT HEALTH SERVICE

The Student Health Service, under the faithful direction of Dr. Albert R. Lamb, Jr., continues to meet the health needs of the students and employees of the Faculty of Medicine.

During the past year there were 397 routine physical examinations on

students and 269 pre-employment physical examinations on new employees. Nineteen students were admitted to the admitting ward and thirty-two to the hospital. Routine chest X rays and routine dental examinations, including X rays, are available to the student body.

Besides providing routine health service, the Student Health Service continues to help students in other ways, such as rendering premarital examinations, completing insurance forms, and offering other similar services.

THE FUNCTION OF MEDICAL EDUCATION

It is generally agreed that the primary function of medical education is to create the environment in which well-qualified students may acquire the knowledge, habits of study, basic skills, sound attitudes, sense of personal responsibility for patients, and understanding of the professional and ethical principles that motivate a true physician. There is no short cut to learning on the part of the student because many of the features of practice, science, and community services cannot themselves be taught, they have to be learned under the guidance of a competent faculty.

Brief reference may be made to a few of the phenomenal changes that have occurred in the health services of the country during recent years. The control of acute infectious diseases and more recently the successful treatment of tuberculosis have had a profound effect not only upon the disorders of childhood and youth but, as a consequence of the control of these and other disorders of adolescence, there has been a noteworthy shift in the age composition of the entire population. The results have placed greater emphasis on the chronic and degenerative disorders of late life. The remarkable advances in the treatment of cardiovascular diseases, both medically and surgically, the recent successes in combatting poliomyelitis, the newer contributions to the understanding of mental disorders, and the great progress in physical medicine and rehabilitation, as illustrations, are having a marked impact on the very nature of medical service and the responsibilities of the physician. The phenomenal growth of a wide variety of prepayment hospital and medical insurance plans running parallel with the scientific developments of medicine and its related professions is obviously modifying the forms and methods of medical care throughout the country.

HEALTH SERVICES AND THE MEDICAL PROFESSION

The whole world is in a state of unrest and change which, even in our own country, is bound to have an impact upon the health services and the medical profession because the latter are essential elements of a modern society. The problems must be considered in that broad context and perspective. Change and evolution are inevitable. Individuals and organizations must learn to adapt themselves to new conditions. Yet, in spite of all of the ferment, the elements of sound professional education and the dedication of the profession and hospitals to the needs of communities and the sick are not altered in any fundamental degree. While it is true that medical education is only a relatively small part of the over-all complex, it is a highly significant feature because of the responsibilities for the supply and education of physicians to meet the future health needs of the country. Although it is not the function of the medical school directly to assume community-wide activities beyond those necessary for its own program, it does have the obligation to educate and prepare men and women to discharge those responsibilities.

Inasmuch as the keystone in the arch of health services is the physician, the question of a sufficient supply is of significance. At the present time there is one to about 750 persons. The gross ratio is approximately sufficient if all were adequately trained, better distributed, up-to-date in their knowledge and skills, and more effectively used in relation to actual needs.

Attention may be called to the fact that during the last forty-five years the number of medical graduates has risen 117 percent while the population has grown 76 percent. The output of the medical schools in recent years has increased more rapidly than the population. Last year the additions to the profession in this country totalled 7,917, almost twice the number of deaths reported (about 4,000). The net gain was about 3,900. The figures are the least significant part of the picture, however, because the quality and competence of doctors are far more important than their numbers.

In relation to the supply of competent physicians the admission of large numbers of graduates of foreign medical schools presents a special problem. At a time when the American medical schools are struggling to maintain high standards the country is welcoming doctors from

every part of the world. Many are excellent individuals with good personal and intellectual qualifications but most of them have had no opportunity in their native lands to acquire a professional education that could be regarded as satisfactory. Also included are several thousand Americans who have gone abroad to study medicine because they could not get into an American school.

At the present time over 25 percent of the house staffs in the hospitals of the United States are aliens. The percentage in a few states is over 50 percent. It has been reported recently that between 5,000 and 6,000 foreign-trained physicians will enter the country this year, compared with a total of 6,977 graduates of all the American medical schools. Most of the foreigners will be graduates of unapproved medical schools. In many sections of the country there are now two classes of citizens as far as medical services are concerned: those who are to be cared for by physicians who have had a satisfactory preparation for medical practice, and those whose medical care will be provided for by physicians who are graduates of substandard schools. The situation today is reminiscent of the diploma-mill era of fifty years ago.

The great influx of foreign physicians has been made possible not by relaxation of the standards of the profession or of the American medical schools but by a national policy. This policy has permitted the immigration to this country of large numbers of displaced persons from various parts of the world without requiring, in the case of physicians, any evidence of their qualifications or competence for medical practice.

An effort is being made now to cope with this problem at its source before the individual is admitted to the country. The "Evaluation Service for Foreign Graduates" has been proposed, a joint undertaking between the medical profession, the hospitals, the educational bodies, and the licensing authorities of the individual states. It is to be hoped that in fairness to the American public as well as to the individuals involved that some equitable plan can be worked out to offer opportunities to foreign-trained physicians who would be welcomed as additions to the medical profession in this country, provided they meet reasonably satisfactory standards of educational preparation.

THE MEDICAL SCHOOL

The medical school, which is the chief source of both the practicing

physician and the medical investigator and teacher, has become embedded in the structure of the university. Since the turn of the century it also has become intimately associated with the teaching hospital, for in the wards and outpatient departments the medical student spends at least two years of his four-year undergraduate course and from one to five years, sometimes more, of internship and residency training. The medical school, because it is the strategic link between the university and the teaching hospital, is able to mobilize the resources of the university and of the modern hospital and bring these to bear upon the diagnosis and treatment of the person who is ill, upon the prevention of disease and disability, and upon the enhancement of individual and community health.

In a country with a rapidly growing population, an increasing average life span, a rising standard of living, and newly awakened public recognition of the benefits of modern medicine, there inevitably arises a demand for more health services and for more physicians. Of equal or even greater importance is the need to maintain and improve the present levels of medical education and of selection of medical students, and the need for developing graduate and postgraduate training programs. It is essential today to assist the practicing physician to keep abreast of the increasingly rapid advances in medical science and the ensuing swift and often radical changes in medical and surgical practice, in measures of prevention, and in medical administration.

During recent months widespread publicity has been given to the fact that leadership in science and technology in this country is threatened by the enormous expansion of similar training in the Soviet Union. Its output of scientists is apparently substantially surpassing the numbers being produced in the United States. The challenge lies not only in the numbers involved (the Soviet block has a larger population reserve), but, most vitally, in our development of the highest quality of scientific manpower, originality in research, and ingenuity in the application of new knowledge and in the organization of human skills.

It seems essential to concentrate upon the quality of those who are educated and trained and upon the level of the educational opportunities offered by the universities and other faculties. The real hope of the situation in the long run is the production of sufficient numbers of scientists whose qualifications and support insure the maintenance of

American superiority and leadership in the advancement of knowledge and the safety of the nation. These objectives can only be accomplished, however, through the effective maintenance of educational institutions and professions which is coming to be recognized as one of the major challenges to the American people.

UNDERGRADUATE MEDICAL COURSE

Today the entire undergraduate medical course is regarded as a unit, not, as so often in the past, a series of individual, independent, and more or less watertight compartments of knowledge. The objective is to produce on graduation neither a specialist nor a practitioner who regards himself capable of rendering every type of professional care but an individual who, after an internship, is a well-rounded and competent family physician. This is illustrated by the shift of the main axis of medical instruction from the subjects of anatomy, pathology, and surgery to biochemistry, physiology, and internal medicine, leaving to graduate education in a hospital residency the proper preparation for the surgical and other specialties. There are 25,486 such residencies approved by the Council on Medical Education and Hospitals, although only a portion can be regarded as educational in character. Many of these are vacant, due in large measure to the demands of the military services, or are filled by graduates of foreign medical schools. This is also true of the 11,048 approved internships available to last year's graduating class of 6,977.

Another feature of present-day instruction is the emphasis upon learning by the student rather than teaching by the faculty. The aim is to select self-starting and self-propelling students who, largely on their own initiative but under guidance and supervision, may secure the elements of a real education, which at the professional level must be largely self-education. Another characteristic is the concept of the longitudinal nature of disease and the entire life span of the individual rather than the attitude so frequently expressed of concern only with episodes of illness and injury. This is important in view of the marked shift in the age distribution of the population with consequent increase in the frequency of many of the chronic and degenerative disorders whose onset is known to start years before they present clinical symptoms and

which, in many instances, can be prevented or cured only if discovered early and treated properly.

Perhaps one of the most notable changes in medical instruction is the return to emphasis upon the patient as an integrated personality—his emotional life, the environment in which he lives, the conditions in his home, his job, and other such factors—not merely upon his pathology. Because the social, economic, and emotional factors in an adequate medical and health service are so important, they inevitably have an influence on professional education. They should supplement, however, not substitute for, the intensive discipline in the basic sciences upon which progress of the last fifty years was founded and upon which the medical advancements, improved patient care, and public service in the future must depend.

Much is being said these days about the long and expensive preparation required for the training of a physician. It must be kept in mind that the basic professional period is shorter than in most countries. One of the real difficulties is the fact that in this country, the college has been interposed between secondary school and the university, as contrasted with the situation elsewhere. For those who desire to specialize, there is the additional requirement of the hospital residency. Many graduates elect to continue their professional training through the longer hospital experience.

The situation has led to numerous suggestions for telescoping the college, medical school, and hospital preparation. Perhaps in the long run the most satisfactory solution will not be that of reducing the quality and necessary length of professional training but of vitalizing the long period of primary, secondary, and college preparation. The over-all span required for medicine today and the concomitant cost of the preprofessional and professional education in this period of inflation has been one of the main reasons for the reduction in recent years in the numbers of well-qualified applicants for admission to medical schools.

THE NEED OF TEACHERS AND INVESTIGATORS

It is well to re-emphasize that the purpose of medical education is not only to train sufficient numbers of competent practicing physicians but

also to recruit teachers and investigators whose responsibilities for the advancement of knowledge and the education of future generations of doctors are of high priority. The production of competent physicians by the teaching institutions will depend not only upon adequate facilities, sufficient financial support, and the recruitment of well-prepared students but above all upon a staff of qualified and dedicated scientists and clinicians.

The education of personnel for the health services, including nurses, dentists, public health and other professional workers, is a national responsibility devolving in the case of medicine largely upon the eighty-one medical schools of the country and their affiliated hospitals and universities. Because of their importance, medical education and research will be supported in one way or another. The alternatives to voluntary assistance from the community and the resources of the institutions might include government subsidy with some degree of control and direction or the further growth of proprietary and hospital medical schools. There are real disadvantages to the public interest in either of these methods.

Research is the life blood of medical education and progress. That this has been widely recognized by the public is evidenced by the many national, voluntary health agencies which through publicity and fund-raising efforts have built up support particularly for individual diseases and for specific projects. These activities reflect a new attitude on the part of the public as well as the profession and have certain undesirable features, including the fact that publicity is not likely to be characterized by understatement. The net results, however, have been a substantial increase in public interest and financial assistance from voluntary sources as well as from federal and state legislatures for research in health and medical fields, all of which has opened opportunities for the development of badly needed teachers and investigators.

THE RECRUITMENT OF MEDICAL STUDENTS

The supply of physicians, medical teachers, and scientists is related to the recruitment of medical students. During recent years the applications for admission nationally have been declining, due in large part to the many opportunities offered to recent college graduates in industry, government service, and other activities which make it possible for a

student to become economically independent at a much earlier age than if he were to pursue a long and expensive professional education. The total number of applicants is still sufficient to fill the classes of most medical schools that are not limited by geographical regulations, but there is a nationwide need for more candidates of high quality.

The decline, at least in quantity, of medical school applicants may change shortly because the enrollment in schools and colleges in the years ahead will be markedly accelerated. For example, the total of pupils in high school in 1950 was 6.6 millions. By 1965 it will be 12.5 millions. The college population of approximately 2.5 million students at the present time will be double that in ten years. In 1930, 12 percent of the students of college age were actually attending institutions of higher learning. This figure rose to 18 percent in 1949 and now is above 30 percent.

The secondary schools and colleges are faced with a major challenge by the greatly increased enrollment predicted at a time when their facilities are becoming obsolete and there is a great shortage of well-trained teachers. The general deterioration of the quality of instruction at the high school and college level, where emphasis is often placed on the average and the social rather than the superior and the intellectual, can only be accentuated by a further over-enrollment, with consequent lowering of the preparation of students coming into the professional schools. In scientific disciplines at least, the advanced student or potential physician can develop only as far as his foundations in earlier education have prepared him. There is a noticeable reduction in the intellectual and emotional motivation of students so essential for medical studies and later professional life. The problem is national in character and fundamental to the future educational structure of the country. 5

Not only is there a serious shortage of satisfactory teachers in general but, from the standpoint of recruitment of personnel for the sciences and the health fields, there is a disturbing reduction in instruction basic to the education of such potential students. For example, it is reported that 20 percent of American high schools no longer offer courses in physics or chemistry, and consequently less than 25 percent of high school pupils have had a course in those subjects. The shortage of competent science instructors in the high schools and colleges is serious.

MEDICAL ECONOMICS

Among the most urgent and immediate problems are those related to certain economic and social aspects of medicine. The impact of such developments as voluntary prepayment medical and hospital insurance is having a pronounced effect upon the forms and methods of practice. One result of these changes has been to disturb the delicate balance of the various elements of medical service, such as the relationships of the doctor and the hospital, those of the doctor and the patient, and the financial arrangements introduced by a third person, namely, the insurance carrier. With over 104,000,000 people in the United States now holding some degree of voluntary prepayment health insurance the problem has become of major proportions, particularly during the last ten years. The expansion of health and related fringe benefits of labor unions is of great significance to the medical profession, hospitals, and teaching institutions. The growth and influence of labor unions in the health service fields on a country-wide basis may well replace the earlier concern over national sickness insurance. The total of the welfare funds of labor unions in this country is now about 50 percent greater than the total of the Social Security Fund of the United States government.

One illustration of the impact of current medical economics is the reduction in ward teaching services so vital in the clerkships, internships, and the residency training programs as well as in research and the continued education of younger attending physicians in hospitals. It will be necessary to make insured patients available in some satisfactory manner to provide opportunities for instruction during the different stages of the physician's training. The most serious difficulties will be in the curtailment of freedom for investigation and the advanced training in the residency programs for the surgical and other specialties. At Presbyterian Hospital 85 percent of the charges for the care of ward patients are met by the City and from the Blue Cross and other insurance plans. Only about 15 percent of the ward patients at the Medical Center are now responsible directly for their own bills.

There is a disposition in many places to pool the fees for insured ward patients and to use the money for strengthening and promoting the educational activities for the house staff. This practice will require, in

some instances, a modification in the way carriers make payment and in the attitude of the local profession. It is hoped that plans can be formulated whereby compensation may be based on the services rendered rather than on fees of individual physicians because in a modern medical program adequate care frequently is rendered by a group working as a team.

Corporation contributions to all private educational institutions last year represented only eight cents of each dollar of expenditures on the part of universities and colleges. The \$100,000,000 given, while large, is only a small fraction of the total national product of goods and services. It was only one-fourth of one percent of net corporate profits before taxes, a small investment indeed in a function essential to American society and to American industry as well. One-fortieth of one percent of those net profits would underwrite the present deficits of the medical schools of the country.

It is also worthy of note that the entire cost of medical education in the country at the present time is only about one percent of the expenditures for all forms of health services. The net cost is only one-tenth of even that. The expenditures are small indeed when compared to the vital services that are rendered to the people of this country. The profession, alumni, foundations, industry, the public, the National Fund for Medical Education, the American Medical Education Foundation, and other sources of supplementary financial support are necessary to maintain the high standards of medical education and leadership in America and to preserve even a few islands of high excellence.

The effects of current pressures upon the operation of medical schools are of concern to all who are interested in the future of medicine. The economic factors are evidenced by the number of unfilled positions on teaching staffs and the drift away from academic medicine toward private practice. These and other forces explain the trend toward a modernized version of the "proprietary" and "hospital" medical school, now the common pattern in every section of the country. This is to be regretted because the rapid advance of medical teaching and investigation during the last forty years has been largely due to the development of full-time research and teaching opportunities in the clinical departments of the medical schools and the consequent drawing of well-trained young men and women into academic careers.

One result of the widening interest of the public in demanding and providing support through various channels for better health services has been the necessity of the physicians, the medical profession, and the medical schools to define more clearly their responsibilities to the community and to the needs of individuals, industry, and society as a whole. Mention need only be made of the catastrophic and chronic diseases, the problems in rural areas, the needs of the aged, those with mental disorders, the health needs in industry and schools, and the rehabilitation of the handicapped, to suggest the expanding areas of medical participation in public questions. If the different organizations, such as the insurance carriers, industry, the National Fund for Medical Education, and the federal and state governments, are going to be called upon in large measure to finance the necessary health services of the country, it is inevitable that they must have a fuller understanding of the problems of medical practice, service, and education. The young physician must be more fully equipped and have a better appreciation than now is so often the case of his responsibilities and obligations in present-day society.

There obviously is needed a high degree of cooperation and understanding on the part of the practicing profession as well as the public of the objectives of the teaching institutions, which must not be allowed to falter or to weary in their efforts to maintain and improve standards. Nothing can be gained by open disputes or legal action or other activities that emphasize disagreement and differences of opinion within the profession and between it and the institutions engaged in this large national enterprise. These can be largely avoided if emphasis is placed where it belongs, namely, on the best interest of the patient and on the supply of competent physicians for the future needs of the country.

These and other developments have introduced challenges to the profession, hospitals, industry, and the government to find ways and means of adapting the health program of the country to the changing conditions and at the same time preserve and improve the quality of medical care that has been available to many, although not to all, members of our society. The American people are convinced of the value of adequate medical care. They are determined that the results of modern scientific knowledge be made available to the entire population. This is an indication that medical security in some form is coming, thus far

largely on a voluntary basis in keeping with our system of free enterprise. The rapid evolution of this concept in the United States has placed an obligation upon the medical schools and universities of the country to produce the necessary personnel to make possible the maintenance and improvement of health services for every economic and geographic group in the country. Medical education, if properly supported, is prepared to meet its obligations to the society of tomorrow.

The Faculty is alert to the newer demands and opportunities of strengthening the health and well-being of the nation. It maintains a long established practice of continuous appraisal of the instructional program under a representative, experienced Committee on Instruction. That committee is not so much interested in tinkering with the curriculum—an activity which has little if anything to do with real education—but rather with the dynamics of learning and the intimate daily associations of students and staff. These objectives are sought through such devices as the group clinic, the integration of teaching on given subjects by several departments, the erasure of many of the traditional lines of separation between disciplines, the pooling and reduction of lectures, the emphasis on an individual tutorial type of instruction, the correlation clinics, the reliance on methods of instruction that are based on learning by the student rather than teaching by the staff, the constant focus on the entire medical course as a unit, the values of early diagnosis, treatment, and prevention, the interpretation of the economic and social aspects of modern medicine, the effective supplementation of teaching in the affiliated voluntary, municipal, and rural hospitals, and the scheduling of student programs which make possible the effective utilization of the time and efforts of faculty as well as students.

Coupled with the constant efforts to improve the opportunities for learning has been the diligent and time-consuming activities of the Committee on Admissions, under the able chairmanship of Associate Dean Severinghaus. The committee, comprising a diversified group, most of whom have worked together for ten years, has acquired great skill and experience in dealing with this essential feature of the program. The increasing trend to select men and women on the basis of a broad, liberal education rather than on a narrow concentration in the so-called "premedical" sciences (which in reality are not and should not be "pre" anything) is paying rich dividends in the performance of the

students. The recent achievements of the members of the fourth-year class in their internship placements in the national matching plan in competition with the graduates of all other schools is a matter of satisfaction to them as well as to the Faculty.

Medical education is on the move toward ever expanding responsibilities in the sciences and their applications to the health needs of individuals, families, industry, the community, and the nation. It will meet those obligations as fully as resources, personnel, students, and financial aid will permit.

STAFFING THE COLUMBIA-PRESBYTERIAN MEDICAL CENTER

During the year the Faculty of Medicine, in cooperation with the Medical Board of Presbyterian Hospital, made a study of the over-all staffing problems of the Medical Center. The Joint Committee first undertook to reaffirm the original objectives of the Medical Center, with particular emphasis upon the tradition of education, research, and patient care that has been developed during the last twenty-eight years. The second purpose was to examine the present activities of the Medical Center in relation to the original aims, with an evaluation of the trends in current professional practice, community activities, and the national economy which have had an impact on the functions originally outlined.

Special attention was given to the growth of scientific knowledge and its application in medical practice, the influence of the inflationary spiral, the high level of prosperity in the country, the effects of changes in the age composition of the population, and the growth of prepayment medical and hospital insurance plans, as illustrations. All of these have had an important bearing on the purposes of the Medical Center and the responsibilities of its faculty to adapt to the changing conditions that now confront medical practice, education, and research.

A number of these elements have contributed to the gradual shift in the center of gravity toward private practice in the clinical departments and toward the expansion of research activities conducted largely with funds from outside sources. Those patients on the ward services who have medical insurance in addition to the hospital coverage have presented a series of new problems, particularly in relation to the payment for professional services rendered by residents and full-time members of the staff.

The growth of research and the demands for investigative work have seriously overtaxed the regular laboratories of the Medical School but, because of the outstanding eminence and abilities of many of the personnel, the demand continues unabated for further expansion of these activities.

In making its study, the Joint Committee bore in mind the importance of keeping the entire program in reasonable balance. The conclusions indicate that some reorganization is needed in certain instances in order to relieve current pressures or to correct any unwarranted deviation from the primary purposes of the institution. A summary was prepared of the reviews conducted periodically during the last twenty-five years, together with an indication of the extent to which the recommendations have been met. Studies were also made of the relationships of the residency programs at the Medical Center, including those at the New York State Psychiatric Institute and the Francis Delafield Hospital. The conclusions reached were:

1. The present clinical staff, except in a few instances, is larger than necessary for the educational and patient needs of the Medical Center.
2. There should be a gradual reduction in the over-all clinical staff through
 - a. Closer scrutiny of the educational, research and patient needs of services when new appointees are proposed in order that overcrowding gradually may be controlled at the source.
 - b. Limitation of private office accommodations to five years for attendings upon retirement at the age of 65 years, on condition that they share those facilities with some other member of the staff.
 - c. Reduction of office and admitting privileges of those attendings who diminish their teaching and hospital responsibilities; opportunities for private practice at the Center may thereby be opened to the younger members of the staff who carry teaching and hospital responsibilities and who will be the staff of the Center in the future.
3. The director of each service should be required to review and to report to the Hospital and the University annually the teaching, hospital, and private practice activities of each member of his staff.
4. An Advisory Committee on Private Practice should be created with

the duty of consulting with and advising the directors of services in regard to space and time allocations in the private practice facilities anywhere in the Medical Center.

5. The residency program, which has expanded greatly, represents a form of group practice which overlaps some of the functions of the younger attending staff. It should be reviewed annually, with the view, among other things, of maintaining clinical responsibilities for beginners in practice.

6. The teaching and research activities of the attending and residency staffs of the Francis Delafield Hospital and the New York State Psychiatric Institute should be integrated as fully as possible with the staffs of the other units of the Medical Center.

7. Modern offices should be provided to accommodate not more than the number of physicians presently located on the main, first, and fourth floors of the Hospital and in the private offices in the Neurological Institute, plus facilities for some members of the Psychiatric Service.

DEPARTMENT OF ANATOMY

Professor SAMUEL R. DETWILER, Executive Officer

The department has suffered the loss of one of its ablest teachers in the death of Professor Adolph Elwyn, associate professor of neuroanatomy, who died on June 9, 1955. His textbook on human neuroanatomy has been widely used throughout the medical schools in the United States and in foreign countries. The course in neuroanatomy is now being conducted by Professors Charles R. Noback and Malcolm B. Carpenter, who have written a revised laboratory manual and who are currently working to improve and enlarge the teaching slide collection. As in the past, they have excellent cooperation from members of the Department of Neurology in the form of clinical demonstrations which are integrated with lecture material and laboratory study.

The course in oral histology and embryology to freshman and graduate dental students and hygienists has undergone considerable improvement under the continuous effort of Professor Edmund Applebaum.

Throughout the academic year, 116 residents from affiliated hospitals have registered for various courses in the department. The course in clinical anatomy to residents in orthopedic surgery, under the direction of Professor Emanuel B. Kaplan, continues to be a very popular and sound undertaking. Various members from this and other departments, as well as individuals from other institutions, have given freely and generously of their time to

make the course a success. Professor Kaplan is also giving a course in advanced surgical anatomy of the hand.

Professor Christian A. Hovde has resigned to take up a new post at the Seton Hall College of Medicine and Dentistry in Jersey City, New Jersey.

Professor Wilfred M. Copenhaver is continuing his studies to determine the factors involved in the growth of cartilage tumors induced in salamanders reared in propylthiouracil. In collaboration with Dr. William Gregory Cooper of the University of Colorado School of Medicine, an investigation is being completed on the distribution of succinic dehydrogenase in different parts of the amphibian heart. A study is also in progress on the distribution of radioactive sulfate in the heart of fetal, newborn, and adult rabbits. This work is being done in cooperation with Professor George K. Smelser.

Professor Smelser has been studying the development of the rabbit eye from the earliest differentiation to twenty days post partum. He has continued his experimental studies on exophthalmus, showing that the adrenal gland, although affecting the degree of exophthalmus, is not a necessary factor.

Professor Herbert Elftman has investigated the changes in the phospholipid constituents of the tissues of the body as they respond to different physiological stimuli. Particular attention has been paid to the changes occurring in various target organs as a result of endocrine stimulation. In his other field of research, the biophysics of human movement, Professor Elftman has analyzed the factors in gait which influence the efficiency of movement, a matter of interest in the rehabilitation of individuals with locomotor disabilities.

Professor Edmund Applebaum is collaborating with Professor Melvin Moss on a study of differential growth of vertebrate teeth. He has also been studying the problem of incipient dental caries by polarized light, and by grenz ray. The grenz-ray studies are carried out in collaboration with Dr. Irwin Mandel.

Professor Charles R. Noback has been making a comparative study of the brain-stem nuclei of the gorilla and man in order to obtain cytomorphological data on the brain stem. Further studies on the histochemistry of degenerating nerves in the central nervous system have been carried out. A study is being made of epiphyseal fusion in adolescents. This is being done in collaboration with Professor Moss.

Professor Frederic J. Agate is continuing his work on the nephrotic syndrome in the hamster. He is also continuing his research on the relations of the hypophysis to defense against low environmental temperatures. In collaboration with Professor Seymour Lieberman of the Department of Obstetrics and Gynecology and Dr. Sam Beiser and Professor Bernard Erlanger of the Department of Microbiology, investigations are being carried out on the physiological effects of protein-steroid conjugates.

Professor Moss is continuing his studies on skeletal growth and in particular on cranial growth.

The relation of calvarial deformation to cleft palate is being studied in the maxillofacial clinic. With the cooperation of the Division of Orthodontics, several studies are under way on the etiology of malocclusions. The differential growth of vertebrate teeth and related structures is being investigated in collaboration with Professor Applebaum.

Professor Margaret R. Murray's laboratory of cell physiology, as in the past, has been very active. Investigations have been concerned with nutrition of the spinal ganglion complex with the aid of chemically defined media. A brief time-lapse movie film has been prepared to show the tetanic response of oligodendroglia to serotonin *in vitro*. A method has been developed to grow normal adult mammary epithelium in quantity in continuous culture.

Professor Carpenter has been studying the relationship between the deep cerebellar nuclei and the fibers of the *brachium conjunctivum* in the rhesus monkey. He was assisted in this investigation by Miss Elizabeth Taber, one of the graduate students. Professor Carpenter attended the Sixth International Anatomy Congress in Paris in July. There he presented a paper and demonstration of previous studies on subthalamic hyperkinesia in the rhesus monkey.

Professor Charles A. Ely is continuing his studies of the application of antigonadotrophic serum to the problem of genesis and differentiation of experimentally produced tumors of the mouse ovary. During the past year special attention was given to observations of antiserum effects on early changes induced in ovaries by total body irradiation.

Professor Dorothy D. Johnson is collaborating with Professor Harry H. Shapiro in a study of the development of transplanted molar tooth buds in the rat. They are using both roentgenographic and histological techniques. Professor Shapiro has been appointed executive director of the Society for the Rehabilitation of the Facially Disfigured, Incorporated.

In his continued investigations with phonocardiography, Professor William Rogers has paid especial attention to the significance of the pulmonary second sound and pathognomonic murmurs in relation to the diagnosis of congenital malformations and acquired valvular diseases. Working under Professor Roger's direction, Mr. Robert Rhodes, a third-year dental student, is experimenting with subperiosteal implants of mandibular dentures in animals to determine their practicability.

Professor Hovde has carried out extensive neurophysiologic and neuro-anatomic examination of the connections of the subthalamic nucleus in the cat and monkey in relation to the function of the basal ganglia. Studies of the effect and possible mode of action of the caudate nucleus upon visceral function have been continued utilizing biochemical and radio-isotopic analysis.

Professor Emanuel B. Kaplan is working on the embryology of the knee

joint menisci as well as on the comparative anatomy of the knee joint for clinical applications. He is also studying the comparative anatomy of the foot, relating structure to function.

Professor Samuel R. Detwiler has completed his two-year term as president of the American Association of Anatomists. He is continuing his experiments on the inductive influence of the spinal cord upon the differentiation of cartilage.

DEPARTMENT OF ANESTHESIOLOGY

Professor EMANUEL M. PAPPER, Executive Officer

The instruction of medical students in anesthesiology has been changed by reapportioning the time allotted to it in the third-year course in surgery. The new arrangement consists of ten didactic sessions and five demonstrations of clinical anesthesia to groups of fifteen students. During the fourth year those students who elect a clinical clerkship in surgery in the Presbyterian Hospital (approximately 40 percent of the class) spend five days as clinical clerks in anesthesiology. The residency continues to be the chief educational program of the department, and the department is considering the possibility of expanding the residency training program in anesthesiology to three years.

Educational exercises on the graduate and postgraduate level also include the presentation of scientific papers to a variety of professional societies. Ninety-one such papers were presented during the academic year and thirty-one papers have been published or accepted for publication during this period.

These educational activities have included the participation by various members of the department in several important conferences. Among them should be mentioned the active collaboration of Professors Virginia Apgar and Duncan A. Holaday and Dr. Leonard Stanley James in the conference on resuscitation of the newborn held at the University of Michigan. Another was the participation of Professors Emanuel Papper and Duncan A. Holaday and Dr. Ernest Salanitre in the hypothermia conference sponsored by four of the subcommittees of the National Research Council. The department also was particularly gratified to conduct a conference on the physiology of the myoneural junction.

Several prominent anesthesiologists from abroad were welcomed by the department. Among them were Dr. Otto Mollestad, director of anesthesiology at the Rikshospitalet in Oslo, Norway; Professor Cornelius Ritsema van Eck of the University of Groningen in the Netherlands; and Dr. John A. Griffiths, a Nuffield Fellow in Anaesthetics.

Professor Papper was given the opportunity to serve as visiting professor of anesthesiology at the Anaesthesiology Center in Copenhagen during

July, 1955. Afterwards, he gave five lectures to the Norwegian Anaesthetist Association in Oslo. In March, 1956, Professor Papper was elected to the Board of Directors of the American Board of Anesthesiology for a six-year term.

During this year the research activities of the department have increased significantly—a welcome sign of the dynamic growth of this specialty at the Medical Center—due to the stimulating intellectual environment of the Medical Center, the availability of excellent clinical material for study, and the “practical” improvements in clinical anesthesia that have already resulted from investigation.

Professor Holaday has been conducting a series of studies on the metabolic components of acid base balance at reduced body temperatures. This is an important problem, since hypothermia is an adjunct for completing certain operations upon the brain and heart.

In collaboration with Professor Alvan L. Barach and Dr. Gustav J. Beck of the Department of Medicine, Professor Holaday studied changes in respiration and acid base balance in a patient who was acclimatized to low tensions of inspired oxygen for the treatment of advanced metastatic malignant disease. He also collaborated with Professor Ralph A. Deterling, Jr., and Dr. Shivaji B. Bhonslay of the Department of Surgery in studies on the mechanical blood pump and oxygenator for extracorporeal circulation.

In association with Dr. Johannes Bartels, who performed the clinical anesthesia, Professor Holaday has made precise studies of acid base balance during hypothermia for clinical surgery. He has also designed, with Dr. John Gilroy of the Ohio Chemical Company, a four-phase, servo-controlled, constant-flow respirator.

Professors Holaday and Lester C. Mark and Dr. R. Cecil Brown of the resident staff have continued their studies of the dilution principle for the measurement of cardiac output. Professor Holaday has also continued his studies on the development of a continuous flow pH meter. A working model has been developed.

Professors Apgar and Holaday and Dr. Leonard S. James have made considerable progress with their studies on the readjustments that occur in respiration and the circulation during the first few hours of life. Their early studies on the transfer of cyclopropane across the placenta suggest that equilibration between mother and infant may occur within one minute. Professor Apgar has completed a series of records on 10,000 newborn infants scored according to the method that she developed. Professor William S. Langford of the Department of Psychiatry, Professor Sidney Carter of the Department of Neurology, and Professor John W. Fertig of the School of Public Health and Administrative Medicine are interested in collaborating in the study with Professor Apgar.

Professor M. Jack Frumin has continued his studies on the method which

he and Mr. Arnold S. Lee have developed for the automatic maintenance of anesthesia. Together with Professor Eli S. Goldensohn of the Department of Neurology and Dr. John F. Schweiss of the resident staff, a study was completed on the electroencephalographic patterns during analgesia with nitrous oxide and oxygen and on immobilization with intravenously injected succinylcholine. In other investigations, Professor Frumin and his associates demonstrated that an electroencephalographic pattern which appeared to be normal could be established during light ether analgesia combined with partial neuromuscular block produced by d-Tubocurare. This method of "anesthesia" has been developed to a considerable degree for clinical use by Professor Jean Henley at the Francis Delafield Hospital. Professor Frumin has also continued his investigations on the effect of intermittent positive pressure breathing with his automatic apparatus.

Professor Lester C. Mark has continued his studies on the intravenous anesthetics in collaboration with Drs. Bernard B. Brodie and John J. Burns of the National Heart Institute and Dr. Leonard Brand. Professor Mark and his colleagues studied the blood brain barrier in dogs of a variety of anesthetic barbiturates and related compounds. Professor Mark and Dr. Brand have continued their studies with Professor Joseph F. Artusio and Dr. Valentino D. B. Mazzia of the New York Hospital and Cornell University.

Professor B. Raymond Fink has begun studies on the electrical activity of respiratory muscles in relation to the depth of anesthesia and has continued his clinical study of the modified oropharyngeal airway with the vallecular extension. Together with Drs. Milos Bask and Vladimir N. Epanchin of the Department of Otolaryngology, Professor Fink summarized his studies on the mechanism of the opening of the human larynx.

Professor Herman Schwartz and Dr. Andrew DeRoeth of the Department of Ophthalmology completed a study on the effects of succinylcholine on intraocular pressure. They also completed a study of the effects of belladonna drugs on intraocular tension in patients with glaucoma.

Professor Edgar C. Hanks is completing his clinical study of patients who have suffered cardio-circulatory collapse and cardiac arrest during the last nine years.

Professor Herbert Rackow and Dr. Ernest Salanitro have continued their studies on the identification and measurement of organic acids with a chromatographic method.

Dr. Vance Lauderdale, Jr., has conducted studies in the local anesthetics with Dr. Richard Fowler of the Department of Dental and Oral Surgery. Dr. Rita Jacobs has also assisted with this study and has been more particularly concerned with the objective evaluation of topical anesthetic agents.

Dr. Norman Bergman has completed his study on the anesthetic problems of patients with meningocele and spina bifida.

Professor Papper has collaborated with Professor Stanley E. Bradley of

the Department of Medicine and Professor David V. Habib of the Department of Surgery in studies of the splanchnic circulation during the effects of analgesics and anesthetics.

Dr. Frederick W. Hehre resigned on February 29, 1956, to accept appointment in the Yale University Department of Anesthesiology. Dr. Leonard Brand was appointed instructor in the department.

DEPARTMENT OF BIOCHEMISTRY

Professor HANS T. CLARKE, Executive Officer

After reporting on the work of the academic year 1954-1955, the department suffered a grievous loss through the untimely death, on June 28, 1955, of Professor Edgar G. Miller. Though he had recently left to take on the duties of Dean of the Graduate Faculties, he had continued to take part in the instruction of medical students. Professor Miller's connection with the department extended over a period of forty-four years. His encyclopedic knowledge of biochemistry was always available to students and colleagues alike, and he was universally regarded as one of the most effective teachers on the Faculty of Medicine.

On May 20, 1956, Professor William J. Gies, who had been executive officer of the department from 1898 to 1928, died at the age of eighty-four. From the time of his retirement in 1937 until the fall of 1955 Professor Gies continued to make this department his headquarters.

Professor Michael Heidelberger, whose retirement takes effect on July 1, 1956, spent the academic year on leave; he worked at the Waksman Institute in Rutgers University, where he continued to carry out his important investigations in the field of immunochemistry.

During the year the following changes of title of staff members became effective: Jeanette Allen Behre from associate to assistant professor; Erich Hirschberg from research associate to assistant professor, assigned to cancer research; Michael Lombardo from research assistant to research associate, assigned to Urology; Ines Mandl from associate in surgery to associate in biochemistry, assigned to Microbiology; Erwin Mosbach from research associate to assistant professor, assigned to Medicine; Howard Sachs from research assistant to research associate, assigned to Psychiatry; Harold J. Strecker from research associate to assistant professor, assigned to Psychiatry. In addition, Isidore Danishefsky was appointed research associate in biochemistry, assigned to cancer research.

Instruction in biochemistry has been given to first-year medical and dental classes and to twenty-six students under the Graduate Faculties, of whom eleven have been carrying on advanced graduate studies towards the doctorate in biochemistry. Fifteen others received instruction at an elementary level; of these, six had their major interest in biochemistry and nine in other

departments of the College. Courses in biochemistry in the School of General Studies were given by Professors Erwin Chargaff and David Shemin.

Of the fifty-one persons holding academic appointments in the department, fourteen have taken part in the instruction of medical and dental students. The others have devoted their entire time to research and instruction of graduate students.

Professor Erwin Chargaff and his group have continued their studies of the chemistry of nucleoproteins, of nucleic acids, and of macromolecular mucolipids from nervous tissue. In collaboration with Professor Calderon Howe of the Department of Microbiology, these mucolipids have been shown to exhibit inhibitory activity in the hemagglutination of influenza virus. In association with Professor Margaret R. Murray of the Department of Surgery, Professor Chargaff has continued to investigate the mechanism of mitosis and the role of nucleoproteins in tissue growth.

Professor Hans T. Clarke, whose retirement takes place at the end of the academic year, has continued his work on the chemical modification of amino acids and proteins.

Professor Zacharias Dische has made notable contributions to knowledge of the role of interconversion of ribose-5-phosphates and hexose-6-phosphates in human blood and in heart muscle under normal and pathological conditions.

Professor Goodwin L. Foster has investigated some of the lower invertebrates with respect to occurrence of the amino acid hydroxyproline.

Dr. Gertrude Gottschall has continued her work on the characterization of proteolytic enzymes in leucocytes of fresh human blood, with a view to studying the action of factors which affect inflammatory responses.

Professor Samuel Graff has continued to direct the biochemical division of the Francis Delafield Hospital, where his study of the leukemia-preventing substance in milk is approaching completion. In collaboration with Professor Alvan L. Barach of the Department of Medicine, he has continued the investigation of the effect of hypoxia on tumor-bearing mice and has initiated tracer experiments designed to elucidate the mechanism of hypoxic phenomena in tumors. He has also continued his metabolic studies of mass tissue cultures. Under his direction work has continued on the antibiotic activity of synthetic analogues of purines and on nucleic acid intermediates in tumor tissue fluids.

Professor Maxwell Karshan has again had complete charge of the instruction of biochemistry to dental students and has continued his studies of the gingiva and alveolar bone in an attempt to throw light on the etiology of periodontal disease.

Professor David Rittenberg has continued his investigations of hydrogenase of bacterial origin, including a study of simple organic chemical models of this enzyme. In this connection he has also investigated the structure of diethyl nitroprusside. Under his guidance Dr. Gerald B. Phillips,

who holds a United States Public Health fellowship, has studied the lipids of human serum.

Professor David Shemin has extended his work on the biosynthesis of porphyrins and the metabolism of glycine by way of the acyl-glycine cycle. In the course of this work he has demonstrated the role of delta-amino-levulinic acid as a precursor of vitamin B₁₂ as well as of porphyrins. He has been awarded a Guggenheim Fellowship to enable him to study microbiological and mutant techniques in California during the summer of 1956.

Professor David B. Sprinson has made marked progress in his study of the biosynthesis of methyl groups and aromatic amino acids.

Professor Stephen Zamenhof, in collaboration with Professor Hattie E. Alexander of the Department of Pediatrics, has continued his studies of the transforming principle and has shown that individual heredity determinants exhibit different stabilities.

The following visiting scientists have taken part in the research activities of the department: John Corcoran, American Heart Foundation Fellow, with Professor Shemin; Sheldon Greer, Damon Runyon Fellow, with Professor Zamenhof; Helmut Kewitz, Ford Foundation Fellow from the University of Berlin, with Professor Nachmansohn; Andrew Nemeth, post-doctoral fellow of the National Foundation for Infantile Paralysis, with Professor Shemin; Gerald B. Phillips, United States Public Health Fellow, with Professor Rittenberg; Dorothea Vossius of the University of Munich, with Professor Rittenberg; Annemarie Weber of the University of Heidelberg, with Professor Nachmansohn.

Fifteen visiting lecturers have contributed to the seminar program: Professor Konrad Bloch of Harvard University; Professor Seymour Cohen of the University of Pennsylvania; Professor Jean Courtois of the Institut de Pharmacie, Paris; Professor Samuel Gurin of the University of Pennsylvania; Professor Charles Heidelberger of the University of Wisconsin; Dr. C. W. H. Hirs of the Rockefeller Institute; Dr. Bernard L. Horecker of the National Institutes of Health; Dr. Farnsworth Loomis, director of the Loomis Laboratories; Dr. Barbara W. Low of Harvard University; Dr. Boris Magasanik of Harvard University; Professor J. Th. B. Overbeek of the University of Utrecht; Professor Emil Smith of the University of Utah; Dr. DeWitt Stetten of the National Institutes of Health; Professor Edward L. Tatum of Stanford University; and Professor Otto Westphal of the University of Freiburg.

DEPARTMENT OF DENTAL AND ORAL SURGERY

Professor MAURICE J. HICKEY, Executive Officer

A study of the undergraduate curriculum has been completed. This task was undertaken with the following objectives in mind: to rearrange the

first-year schedule in order to improve the evaluation of students in their first year; to make better utilization of space in the dental school and the medical school; to separate, wherever possible, basic science teaching from basic techniques. It is expected that this will tend to eliminate the impression that a student's mind is overly occupied with dental technique and to arrive at a trimester system in the first year, which will insure a better utilization of the staff.

The new curriculum will go into effect for the incoming first-year class. It will require three years to completely effect a new curriculum and, during this time, double teaching will impose a serious load upon the dental staff.

The Admissions Committee, under the chairmanship of Professor Joseph A. Cuttita, continues to be faced with the problem of selecting competent students. Although the total number of applicants has increased slightly, there is a further decline in the academic quality of applicants. The competition among schools for the better students is increasing. Scholarship aid is being used as an incentive by some schools and we have had accepted students withdraw in order to accept financial support from another school.

The first-year class was selected from 379 applications. This represents a ratio of 9.4 applications for each accepted student and is an increase from the previous year's figure of 6.9.

Applications were received from fifteen states, the District of Columbia, Puerto Rico, Hawaii, and six foreign countries. The total undergraduate registration of 150 represents seven states and one foreign country (China).

DENTAL CLINIC

During the twelve-month period, from May 1, 1955, to April 30, 1956, there were 13,578 admissions to the dental clinic. Of this number 4,723 were new patients and 8,855 were former patients readmitted. There were 1,784 patients referred from the hospitals of the Medical Center; 386 teachers and students from Columbia University; 277 Medical Center or Columbia University personnel; and 3,726 from other sources. There were 46,823 clinic visits. The operative dentistry clinic completed 2,760 procedures, a decrease of 146. The prosthetic clinic completed 997 procedures, an increase of 144.

DIVISION OF OPERATIVE DENTISTRY

This division, directed by Professor Carl R. Oman, reflects the increasing problem of staffing for adequate teaching and research. For economic reasons several part-time teachers have been compelled to reduce their teaching time.

Professor Oman has continued his research into the use of ultrasonics in dentistry. Professors Harold Sherman and Joseph Fiasconaro are continuing their studies of high-potency local anesthetics in cooperation with the Department of Neurology. To this problem has been added further studies in the evaluation of experimental anesthetic solutions. Professor Joseph

Leavitt and Dr. Irving Naidorf have continued their studies relating to the microbiology of infected root canals. Clinical research relating to the use of mephenesin in operative dentistry is being continued by Professors Cain, Fiasconaro, Sherman, and John W. Fertig of the School of Public Health and Administrative Medicine.

Dr. Kenneth Deesen has developed a method for intraoral photography using a magnifying lens and a front-surface mirror.

Dr. Pandelis Camesas has been appointed a member of the operative division staff.

DIVISION OF ORAL SURGERY

It is with the greatest regret that we record the retirement of Joseph Schroff, William Carr Professor of Oral Surgery. The first graduate of Columbia's Dental School, Professor Schroff has been active in teaching for over thirty years. His place, as head of the division, will be taken by Professor William J. Savoy.

This division is charged with the dual responsibility of teaching and providing clinical service in oral surgery. In other clinics of the dental school, patients are selected on the basis of suitability for students. In oral surgery all patients are accepted and professional service is provided by the attending staff where the surgery is considered too complicated for students.

The division has cooperated with the Department of Anesthesiology in providing material and facilities for research purposes. Professor Savoy is studying the effect of metacorton on post-traumatic swelling and, in cooperation with Professor George W. Hindels, is continuing his study of vitallium implants.

DIVISION OF ORTHODONTICS

This division is directed by Professor Arthur C. Totten. The teaching duties are largely in the field of postgraduate education, but also offer a significant contribution to undergraduate education.

The division is conducting an active research program. It includes a study to show how the Wetzell Grid can be used as a guide to growth and development in orthodontic therapy; the effect of the anterior-pituitary-like substance as an adjunct in orthodontics; a study to determine the temporal range and variation of epiphyseal closure of phalanges and distal ends of the ulna and radius in adolescents. This study is being made in cooperation with the Department of Anatomy.

This division has continued to be very active in providing speakers and clinics for professional societies.

DIVISION OF PEDODONTICS

The division is under the direction of Professor Solomon N. Rosenstein. Accomplishments in the children's clinic were again gratifying. The stu-

dents expressed great interest in management problems of difficult cases and were cooperative in adhering to the requirements of conducting a children's clinic.

Curriculum content was basically similar to that of the previous year. However, a significant change was made in the sequence in which background material and principles were discussed. These principles relate to child patient evaluation and management, deciduous dental anatomy, applied dental development, caries control and tooth conservation measures, and measures for prevention of dental and oral disease in children.

Incidence of dental disease in children is increasing. Measures for control, while necessary, are not adequate to cope with the expanding technical and procedural task. It is essential that emphasis on disease prevention be increased in the undergraduate curriculum in order to develop awareness of, and stimulate thinking about, cariogenic and other oral disease-producing factors. An attempt was made to implement this idea in pedodontics, on the assumption that preventive measures can be applied more effectively in the lower age group.

The postgraduate phase of our teaching activity has been expanded to include three distinct programs: the one-year, full-time course, the two-year, half-time course, and the two-year, full-time fellowship in cerebral palsy and pedodontics. All these courses included assignments for pedodontics conference and clinical practice throughout the academic year. The number of postgraduate students accepted is small because of limited physical facilities. There is increasing evidence of the need for such specially trained dentists.

The research program has been developed to parallel certain aspects of the curriculum, namely, caries incidence and prevention, applied dental development, and caries control and tooth conservation.

Drs. Arnold Rosenberg and George Kiriakopoulos were appointed to the staff.

DIVISION OF PROSTHETICS

The prosthetic division, under the direction of Professor Gilbert P. Smith, is carrying a teaching schedule that permits little time for activities not related directly to daily teaching.

Professor George W. Hindels, in the removable partial-denture field, has introduced new ideas in design to meet newer thoughts in oral physiology. Professors Max A. Pleasure and John J. Lucca have continued in their efforts to simplify and improve clinical procedures in the full-denture field. Under Professor Robert E. Herlands' direction, the clinical crown and bridge work of the students has improved in quality.

Technique courses under the direction of Professors Robert E. Herlands and Howard A. Arden were conducted efficiently and with a student morale that was gratifying.

Professor Herbert D. Ayers conducted the course in dental materials.

Research by Professor Ayers was continued on a number of dental materials projects.

Dr. George Schwendener has been on leave of absence for the year because of illness.

Drs. Edward P. Kessler and John D. Suomi have joined the staff as part-time members.

DIVISION OF STOMATOLOGY

This division, under the direction of Professor Lewis R. Stowe, includes the teaching of oral diagnosis, roentgenology, and periodontia.

The section of oral diagnosis and radiology is supervised by Professor Edward V. Zegarelli. The staff of this section are provided with abundant material for clinical research and teaching. A comprehensive program of clinical research is being carried on by the oral diagnosis staff.

The section of periodontia, directed by Professor Frank E. Beube, is providing teaching in an area of dentistry that is becoming increasingly important in the concept of the practice of dentistry.

Professors Lewis Fox and Saul Schluger with Dr. Henry M. Goldman have published a textbook, *Periodontal Therapy*.

Dr. Seymour Albus has been investigating the absence or presence of bacteria in the gingival pocket, and the role of inflammation on the supporting structures of the teeth subjected to occlusal traumatism.

Professor Frank E. Beube has completed a study on reaction to implantation of human enamel and dentin in the rabbit bone marrow. Further investigation is in progress utilizing various calcified and noncalcified substances as implants.

Dr. Ellen Hosiosky, in cooperation with Professor Carl Oman, has done research on the application of ultrasonics to periodontal procedures.

Professor Melvin L. Morris has continued his studies of periodontal healing and has initiated research on the relationship of gingival form to periodontal pathosis. Three research projects were investigated by Dr. Bernard H. Wasserman in cooperation with Dr. Irwin Mandel: mechanism of calcification of supragingival calculus in vitro; inhibition of calculus calcification in vitro; and elastic acrylic positioners in control of recurrent gingival hyperplasia.

RESEARCH LABORATORY

As the research program expands, space in the research laboratory becomes less and less adequate. Because of the limited facilities, active research by the clinical staff is sharply limited. The laboratory is continuing to cooperate with other divisions and departments within the Medical Center in basic research. The principal avenues of endeavor are still within the fields of growth and development of bone and other mineralized structures.

Studies on carcinogenesis in lower animal forms, such as salamanders and

fish, are continuing. Experiments concerned with the effects of estrogen and low calcium diets on bone and tooth formation are being completed. Investigations of the mechanisms of calculus formation are progressing rapidly. Dr. Irwin Mandel is devoting much of his time to this project and he has been able to formulate some interesting theories which may lead to methods for preventing calculus formation in the mouth.

Dr. George Stein has been studying the tongue and other soft tissues of the mouths of patients on various dietary deficiencies. Dr. Edith Koyoumdjisky, a Louise Ball Fellow in nutrition, is continuing her studies of lysine-deficient rats. Dr. Sydney Horowitz is continuing his studies on growth and form of the skull and dentition. This research involves the study of identical twins and experimental work with rodents.

The research laboratory has been providing a service laboratory for the divisions of oral diagnosis, periodontia, and oral surgery. Three hundred and seventy-five specimens have been processed this year.

Dr. Barnet Levy was a visiting professor of pathology at the new dental school at the University of Texas during the months of February and March. His duties there included helping to organize the pathology laboratory as well as making suggestions for the correlation of the basic and clinical sciences.

POSTGRADUATE PROGRAM

The course in the biological principles of dentistry was most successful this year. It is an integrated basic science program directed toward clinical dentistry, and begins with a discussion of dental caries, discusses the normal tooth, describes the effects of dental caries on the tooth, and follows the course of the unstopped diseases through its many sequelae, emphasizing the basic science necessary to the understanding of the disease process and its treatment.

We have forty-five students registered in our Certificate of Training Program and short courses have been provided for seventy dentists.

DIVISION OF DENTAL HYGIENE

Thirty-two students registered for the course for dental hygienists.

Columbia graduates continue to be sought for outstanding positions as teachers in public schools and in universities. Miss Skaidrite Burkevics, instructor in dental hygiene, has accepted the position of instructor in courses for dental hygienists in the University of Kansas City Dental School.

The senior class shows the highest placement in public schools as dental hygiene teachers of any previous class. Seven candidates for the Bachelor of Science degree in June have been placed in public school systems in New York and Pennsylvania.

Medical Center prophylaxis clinic for adult patients functioned throughout the school year in the Ogur Clinic, and 930 patients were treated.

During the academic year two clinics for prophylaxis were conducted in the demonstration schools: St. Rose of Lima Parochial School and St. Catherine of Genoa Parochial School.

Miss Irma Napp completes the second year of a two-year fellowship granted by the United Cerebral Palsy Association for special study and experience with affected children.

During the year the Alumnae Association of Dental Hygienists has been very active. In addition to providing two scholarships for the coming year, the association presented \$3,800 for the rehabilitation of a laboratory to be known as the Founders Laboratory. Work was completed for the opening of school in September. The laboratory was dedicated on Alumnae Day, April 28, 1956.

DIVISION OF CLINICAL ORAL PHYSIOLOGY

This division, under the direction of Professor L. Laszlo Schwartz, is continuing in its temporomandibular joint clinic the investigations of temporomandibular joint pain and dysfunction. The use of ultra-sound for the relief of spasm of the masticatory muscles is now being explored with Dr. Milos D. Lota of the Department of Physical Medicine and Rehabilitation.

In a study of the effects of Still's disease on mandibular growth, Dr. Harold P. Cobin is cooperating with Dr. Albert W. Grokoest, of the Department of Medicine, and Dr. Henry I. Nahoum, of the Division of Orthodontics.

With the cooperation of Professor Nicholas DiSalvo, a course in clinical oral physiology was given to the senior dental students. A postgraduate course was given in the diagnosis and treatment of temporomandibular joint pain and dysfunction, in which Dr. Charles T. Ryder, of the Department of Orthopedic Surgery, and Professor Ruth S. Moulton, of the Department of Psychiatry, cooperated. Dentists from many parts of the country attended, as well as Dr. Ulf Posselt of the Royal School of Dentistry, Malmo, Sweden, and Dr. Ino Sciaky, dean of the dental school of the Hebrew University of Jerusalem, Israel. The teaching program was aided by the completion, by Dr. Charles M. Chayes, of a film on mandibular dysfunction.

During the year, the symposium on dental and facial pain, presented at the twenty-fifth anniversary of the Columbia-Presbyterian Medical Center, was published in the *Journal of the American Dental Association*.

DEPARTMENT OF DERMATOLOGY

Professor CARL T. NELSON, Executive Officer

The past academic year was of particular significance to the Department of Dermatology since it marked the completion of a long-projected ward

unit within Presbyterian Hospital. New staff offices were also constructed to permit the transfer of the administrative functions of the department from the laboratories in the College building.

The next major problem confronting the department is the establishment and maintenance of an adequate full-time or geographic full-time staff. In these times, however, it is perhaps unrealistic to expect that the financial support for specialties such as dermatology can be derived entirely from university sources. It may be that so-called geographic full-time appointments will provide a solution, in that limited private practice may be used to supplement modest fixed salaries from university funds.

No major changes were made during the academic year in the undergraduate curriculum or in the graduate training program for residents and fellows in dermatology. Two additional residency positions were authorized for the dermatological service in Presbyterian Hospital, and these have been integrated into the course of graduate training offered by the department. Special courses of lectures and seminars were conducted during the academic year by Professor Leonard T. Chavkin of the Columbia University College of Pharmacy and by Mr. John Reynolds of the Picker X-Ray Corporation, New York City. Mr. Reynolds' lectures were given as part of a joint program with the Department of Radiology.

For reasons of health, Professor Rhoda W. Benham will retire from active duty in the department this June. Professor Benham has gained world-wide recognition for her scientific contributions in mycology and for her ability as a teacher of medical mycology. A generation of graduate students in microbiology and dermatology has benefited from the kindly and patient teachings of this remarkable scientist. Other changes in personnel in the department during the year were the resignations of Dr. Harvey Blank and Dr. George W. Hambrick, Jr. Dr. Blank became professor and head of the Department of Dermatology at the University of Miami, and Dr. Hambrick was appointed associate in dermatology at the University of Pennsylvania.

It is a pleasure to record the promotion of Dr. Gerald F. Machacek to associate clinical professor of dermatology and of Dr. Charles F. Post to instructor in dermatology. Dr. James T. Hearin was appointed assistant in dermatology and will participate in the teaching program for fourth-year medical students at the United States Public Health Service Hospital, Stapleton, Staten Island. Dr. Bohdan Dobias was also appointed assistant in dermatology.

During the past year, a number of foreign physicians have been guests of the department. These included Dr. Clovis Bopp, University of Porto Alegre; Dr. Hennie H. Haaland from Norway; Professor Claude Huriez, University of Lille; Dr. Juan Ponce de Leon from Peru; Dr. Pyotr V. Kozhevnikov from the Institute of Advanced Medical Studies, Leningrad; Dr. Boris P. Pashkov from Moscow; Dr. Nikolai S. Smelov of the U.S.S.R.

Ministry of Health, Moscow; and Drs. Jozef Towpik and Z. Capinski of the Panstwowy Instytut Dermatologii i Wenerologii, Warsaw.

Professor George C. Andrews and Dr. Anthony N. Domonkos continued a study of the effectiveness of the protective measures employed at the present time in the treatment of dermatologic patients with X rays and radium. Dr. Domonkos extended the study of neutron activation analysis of arsenic in keratoses and cutaneous epitheliomas.

Professor Benham, in collaboration with Mrs. Christine K. Alexio and Mr. J. Dennis Pollack, continued the investigation of the antigenic structure and serological behavior of the genus *Candida*. Dr. Dobias initiated a study of the factors related to the pathogenicity of *C. albicans* and has succeeded in preparing an endotoxin which reproduces in experimental animals some of the hematologic changes found in generalized moniliasis.

Dr. Margarita Silva-Santiago continued her studies on the nutritional requirements of the dermatophytes with special reference to the relationship of amino acid utilization and the morphological characteristics of *T. rubrum*. With Professor Beatrice M. Kesten, Dr. Silva also extended an investigation of the epidemiology of infections with *T. rubrum*, particularly with regard to the familial incidence and duration of such infections. In collaboration with Dr. Arturo L. Carrión, Dr. Silva recently completed a taxonomic study of the fungus formerly called *Sporotrichum gougerotii*.

Dr. Helen O. Curth, in collaboration with Drs. Madge T. Machlin and Bertha Aschner, made further studies on the relationship of acanthosis nigricans to visceral cancer. Dr. Justina H. Hill initiated a study of the comparative effectiveness of the *T. pallidum* complement fixation and immobilization tests in the diagnosis of syphilis.

Professor J. Lowry Miller, with Drs. Hill and Meyer H. Slatkin, completed an investigation of the pattern of treponemal immobilization reactions in the spinal fluid of patients with various types of syphilis of the central nervous system. In collaboration with Dr. Marvin Brodey, Professor Miller also continued the long-term study of the premonitory and ultimate clinical significance of persistent biologic false-positive reactions with standard serologic tests for syphilis.

Mrs. Julia M. Einbinder and Professor Nelson studied further the effects of corticosteroids and other hormones on tissue electrolyte changes in anaphylaxis and other hypersensitive states.

Dr. Victor M. Torres, with Mrs. Einbinder and Professor Nelson, completed a study of the relationship of hexosamine levels in the blood and skin of patients with psoriasis, and the clinical activity of this disease. Dr. Benjamin Schwimmer and Professor Nelson continued a study of the specificity of the Kveim test in sarcoidosis.

Dr. Leo Schweich, with Drs. Harriet B. James and John T. McCarthy, studied the therapeutic effect of biotin in the management of various dermatoses of the seborrheic type. In collaboration with Dr. E. William Jewell,

Dr. McCarthy also investigated the clinical value of absorbable gelatin sponge powder with powdered antibiotics in the local treatment of chronic cutaneous ulcers of vascular origin. Dr. F. Philip Lowenfish studied the effects of prednisolone in a variety of dermatological diseases and Dr. Dabney Moon-Adams, with Dr. Slatkin, completed a case study of familial hyperpigmentation with dystrophy of the nails.

During the past academic year, members of the department continued their active participation in the proceedings of various scientific and educational organizations. Twenty-two papers were published by members of the department during the year, and fifteen gave presentations before various scientific assemblies. A number of distinctions and honors also came to members of the department during the past year. Dr. Andrews was chairman of the panel on cutaneous malignancy of the American Academy of Dermatology and Syphilology, and also was elected a member of the Committee on Education of that organization. Drs. Helen Curth and William Curth were invited to participate in the meeting of the Société Française de Dermatologie et de Syphiligraphie in Paris. Dr. Machacek was president of the New York Dermatological Society, and Professor Miller served as its secretary. Dr. Kesten again served as secretary of the American Board of Dermatology and Syphilology. Professors Andrews, Paul Gross, Kesten, Machacek, Miller, and Nelson, and Drs. Domonkos and Lowenfish, participated in the twenty-sixth series of the Postgraduate Radio Program of the New York Academy of Medicine.

DEPARTMENT OF MEDICINE

Professor ROBERT F. LOEB, Executive Officer

It is gratifying to be able to acknowledge increases in salary for a number of members of the full-time staff of the department. It is earnestly hoped that this is but the first step towards increases which will continue to make it possible for individuals of demonstrated research and teaching capacities to continue their activities without the deflection of their efforts by private practice.

From time to time it seems essential to find means of strengthening the research and teaching opportunities in various segments of the activities in the department. Happily, this has been achieved in the important area of cardio-respiratory study, in which the department has exercised outstanding leadership during the past two decades. At Bellevue Hospital, a substantial gift has made possible the development of spacious and well-equipped laboratories for Professors André Cournand and Dickinson W. Richards and their associates to carry on and to extend their activities. At the Medical Center, the Presbyterian Hospital has completely remodeled the laboratories under the direction of Professor Alfred P. Fishman and of Professor René

Wégria. The improvements at the Medical Center have made possible desirable, and indeed essential, cooperative studies between the Departments of Medicine, Surgery, and Pediatrics.

It is with profound regret that the sudden death of Professor Kenneth B. Turner is reported. Professor Turner, an investigator, teacher, and clinician of great distinction, was a member of the Department of Medicine for more than twenty-five years and was an inspiring leader. In addition to his school and hospital activities, Professor Turner made a notable contribution to the war effort as the first liaison officer of the Committee on Medical Research under the Office of Scientific Research and Development to the Medical Research Council of Great Britain. It is also with deep regret that the death of Dr. Franklin A. Stevens, long a member of the department, is recorded. For many years Dr. Stevens contributed to the field of immunology and served as chief of the Allergy Clinic in Vanderbilt Clinic.

On the thirtieth of June this year Professor Ralph H. Boots retires after almost three decades of association with the department. His efforts, combined with those of the late Professor Martin H. Dawson and Professor Charles A. Ragan, were responsible for the development of the Edward Daniels Faulkner Clinic for the study of arthritic disorders. Dr. Henry E. Marks retires after long service devoted primarily to the clinical study of diabetes mellitus and the management of patients with this disturbance. Professor William H. Sheldon has resigned at the completion of a ten-year program of study of human constitution in health and disease.

Professor Charles A. Ragan's designation has been changed to that of associate professor of clinical medicine; Drs. C. Dary Dunham and Michael J. Lepore have been promoted to assistant clinical professors; and Drs. David Schachter and Donald F. Tapley have been appointed assistant professors on a full-time basis.

During the past year members of the department have contributed of their experience and energy to organizational health activities in the community. Professor George A. Perera was a guest speaker at the London Postgraduate Medical School and participated in a medical survey in the Middle East. Professor John V. Taggart lectured at the International Congress of Biochemistry in Brussels and at the International Symposium on Enzymes in Detroit. Professor Karl Meyer delivered a Harvey Lecture and lectured at the International Symposium on Macromolecular Chemistry at the Weizmann Institute in Israel. Dr. Alfred Linker was appointed an established investigator under the American Heart Association. Professor Stanley E. Bradley was elected president of the American Society for Clinical Investigation. Professor Dickinson W. Richards was named section chairman of the Inter-European Cardiological Congress to be held in Stockholm and became chairman of the Awards Committee of the John Polachek Foundation. Professor William B. Sherman was named president-elect of the American Academy of Allergy. Dr. Nicholas P. Christy was appointed

scholar of the John and Mary R. Markle Foundation. Professor David Seegal served on the Mayor's Committee for the Aged and the Technical Advisory Committee of the Community Service Society. Professor Alvan L. Barach was made chairman of the Research Council of the American College of Chest Physicians. Professor Ragan completed his term as chairman of the Metabolism and Nutrition Study Section and became a member of the Training Grants Committee of the National Institute of Arthritis and Metabolic Diseases of the National Institutes of Health. Professor René Wégria lectured at the Universities of Brussels and Louvain. Professor Cournand has also been invited to participate in the Inter-European Congress of Cardiology in Stockholm and to lecture to the International Physiological Congress in Brussels as well as at the International Congress of Internal Medicine in Madrid. Professor Sidney C. Werner was made an honorary member of the Endocrine Societies of Argentina, Colombia, and Haiti. Professor Charles A. Flood delivered a series of lectures before the Argentine Congress of Gastroenterology. Dr. Felix E. Demartini was made secretary-treasurer of the New York Rheumatism Association and Professor Frederick R. Bailey continued as chairman of the Committee on Public Health of the New York Academy of Medicine and as a member of the Governing Board of the Family Health Maintenance Demonstration of Montefiore Hospital and the Community Service Society. Professor Franklin M. Hanger served as a member of the American Board of Internal Medicine. Professor Robert F. Loeb served on the Atoms for Peace Awards Nominating Committee and has become a member of Medical School Grants Advisory Committee of the Ford Foundation. He also joined the Medical Visiting Committee of the Brookhaven National Laboratories. In addition to the above-mentioned activities, many members of the department have been invited to deliver lectures at many universities throughout the country.

A number of distinguished foreign visitors have participated in the regular clinical conferences and Saturday clinics. Among these were Professors Robert Platt of the University of Manchester, Max L. Rosenheim of University College Hospital in London, and Jules Stahl of the University of Strasbourg. Lecturers from many American universities also contributed to the instructional program. Dr. Harry Eagle of the National Institutes of Health delivered the first John G. Hawley Memorial Lecture. As in other years, the department afforded opportunities for advanced study for a large group of fellows from foreign countries as well as fellows of a number of granting agencies in this country.

It is a great pleasure to report in brief at least a part of the research activities of members of the department. During the past academic year Professor Stanley E. Bradley has been associated with a group of collaborators including Drs. Burton Combes and Alfred W. Childs, fellows of the American Heart Association, and Dr. Henry O. Wheeler, a fellow of the Life Insurance

Research Fund, working on the measurement of hepatic blood flow. Drs. Wheeler, Combes, and Childs, with Professor Bradley, have continued their analysis of the splanchnic circulation time. Dr. Wheeler is initiating a study of discrete distributions of flow and volume within separate components of the splanchnic bed in the dog. This group of investigators has made further studies of nephron delay in patients with renal insufficiency. Dr. Childs has completed his study of dextran and plasma protein excretion in the urine of patients with renal diseases.

Professor John V. Taggart has continued studies on the renal mechanism underlying the tubular excretion of p-aminohippurate (PAH). Drs. John H. Bryant and Irving H. Goldberg of the resident staff have undertaken studies on the renal excretion of various ethereal sulfates. Dr. William J. Hensley, Rockefeller and Fulbright fellow from the Department of Biochemistry at the University of Sydney, and Dr. Edwin P. Maynard are studying the intestinal transport of sugars and amino acids *in vitro* through the use of sacs of everted small intestine from the hamster. Dr. Richard J. Cross, concluding his incumbency of the Walter W. Palmer Fellowship and collaborating with Professor Taggart, has been studying the nucleotides of kidney tissue.

Professor Karl Meyer's laboratory has continued studies on the isolation, structure, and enzymatic breakdown of the mucopolysaccharides of connective tissue. In collaboration with Drs. Alfred Linker and Philip Hoffman, a series of polysaccharides apparently related to, but not identical with, heparin have been isolated from aorta. Dr. Hoffman has continued studies on the structure of chondroitin sulfate B of skin and on keratosulfate of cornea and bone. Dr. Linker has been studying the enzymatic and chemical breakdown of chondroitin sulfate A and C. Mr. Ralph Heimer has continued studies on the structure of sialiomucoid of submaxillary gland. Dr. B. E. C. Nordin of the Postgraduate Medical School of London has worked in Professor Meyer's laboratory on certain aspects of calcium metabolism.

In July, 1955, the reorganization and expansion of the cardio-respiratory laboratory mentioned above was virtually completed, and two broad programs of research were initiated by Professor Alfred P. Fishman and his collaborators: a study of the physiology of respiration and circulation in normal man, and an investigation of alterations in the respiration and circulation in various types of cardio-pulmonary diseases. Research in the first category included definition of the gas-exchanging characteristics of the lungs, the elastic characteristics of the lungs, the effects of drugs on the heart and pulmonary circulation, and an analysis of pressure pulses recorded directly from the exposed human heart. Research in the second category included a study of alveolar hypoventilation as exemplified by kyphoscoliosis, and an analysis of hemodynamics in mitral stenosis and insufficiency. These studies were conducted with Drs. Gerard M. Turino, Edward H. Bergofsky, A. Gregory Jameson, Martin Brandfonbrener, and Tor Richter. In addition, conjoint problems were undertaken with the Department of Pediatrics on

cardio-respiratory function in patients with cystic fibrosis and Cooley's anemia. Participating in these latter studies were Dr. John A. Wood and Drs. Paul A. Di Sant'Agnese, Sidney Blumenthal, and Sylvia P. Griffiths of the Department of Pediatrics.

Professor René Wégria, together with Drs. Hsueh-Hwa Wang, Vincent V. Glaviano, and Gerhard Muelheims, has continued his study of problems concerned with the regulation of the coronary circulation, cardiac work, and metabolism under varied circumstances. Preliminary experiments have been conducted on the effect of epinephrine, nor-epinephrine, pitressin, and bile salts on coronary circulation, cardiac work, efficiency and metabolism. In collaboration with Professor Bradley and his group, the effect of occlusion of the hepatic artery on the hepatic circulation is being studied. Two Columbia students, Eugene R. Kelly and Norman Ertel, and a student from New York University Medical School, Joel Felsher, have spent their elective period in the laboratory.

Dr. Stuart W. Cosgriff has completed a study of oral administration of Vitamin K₁ in relation to excessive hypoprothrombinemia during anticoagulant therapy. His ambulatory program of anticoagulant therapy has been extended to a study of patients with arteriosclerotic coronary disease who have experienced an embolism. A study of hemorrhagic complications occurring during anticoagulant therapy has been conducted. A study of a new technique of prothrombin time determination is being carried out by Dr. Cosgriff.

With Dr. Gerald Cohen, Professor Marcel Goldenberg has developed a new fluorometric method for the simultaneous estimation of adrenaline and nor-adrenaline in solution. Professor Goldenberg with Dr. Cohen has extended his observations on urinary catechol amine excretion to a total of fifty-six cases of pheochromocytoma.

During the past year Dr. John H. Laragh has continued his observations of the hormonal factors active in the production of edema and their relationship to electrolyte metabolism. Working with Dr. Herbert C. Stoerk of the Merck Institute, Dr. Laragh has been studying sodium depletion in the dog. In addition, Dr. Laragh and Dr. Helen M. Anderson have been engaged in a study of the hyperkalemia which has been seen in conditions of sodium depletion.

Professor Sidney C. Werner has studied further his triiodothyronine suppression test. In collaboration with Professor Howard Levene of the Department of Mathematical Statistics and Howard Levi of the Department of Mathematics, studies were continued upon the turnover rates and nature of the iodine compartments of the body. Studies are also continuing on an assay method for thyrotropin in conjunction with Dr. Hans W. Neuberg and Dr. Bento C. Coelho of Brazil.

The following fellows have been collaborating with Professor Joseph A. Jailer during the past year: Drs. Nicholas P. Christy, Donald Longson of

the University of Manchester, Dorothy Krieger, Stanley Ulich, and Adele Dellenbaugh, the latter from the Department of Pediatrics. An attempt has been made by this group to identify the fundamental defect in Cushing's syndrome due to bilateral adrenal hyperplasia. Dr. Christy, with Dr. Anthony Donn of the Department of Ophthalmology, has studied the relations of typhoid vaccine to plasma 17-hydroxycorticosteroid levels in human subjects. In addition, a study by Dr. Christy of the adrenal response to insulin hypoglycemia has been undertaken with Dr. Mary Knight of the New York State Psychiatric Institute.

Professor George A. Perera, together with Dr. William H. Hulet, has been investigating various new drugs in relation to hypertensive vascular disease, including some of the tranquilizing agents and analogues of serotonin, as well as such ganglionic-blocking drugs as pentolinium and derivatives of isoindoline. In addition, he has concluded studies initiated by the late Professor Kenneth B. Turner, dealing with lipoprotein and cholesterol patterns in patients with myocardial infarction. Professor Abbie I. Knowlton and Dr. Emily N. Loeb, in collaboration with Dr. Herbert C. Stoerk of the Merck Institute, have established that several of the recently synthesized analogues of hydrocortisone may produce an elevation in the blood pressure of the adrenalectomized rat under conditions of sodium restriction with suitably large doses.

Professor Charles A. Ragan has continued work on the mechanisms involved in the serologic reactions seen in rheumatoid arthritis. A precipitin reaction between human gamma globulin and rheumatoid serum or its euglobulin has been found by Dr. Wallace Epstein, a fellow of the Arthritis and Rheumatism Foundation. Another fellow, Dr. Arthur I. Snyder, has continued his study of inflammation and repair and of factors which modify these processes. With Drs. Albert W. Grokoest and Felix E. Demartini, Dr. Snyder is continuing the study of juvenile rheumatoid arthritis. Dr. Demartini is studying some aspects of the metabolism of salicylates. Active cooperation is continuing with the tissue culture and histochemical laboratory, with the Departments of Surgery, Physical Medicine and Rehabilitation, Orthopedic Surgery, and with the Columbia Division at the Goldwater Memorial Hospital. Two visiting fellows have worked with the Faulkner group in the last year—Dr. Alan M. Johnson of Westminster Hospital, London, and Dr. James Sharp of the Department of Rheumatology, University of Manchester, England.

Dr. Daniel L. Larson's studies have been largely involved with the development of techniques for continuous flow, hanging curtain, filter paper electrophoresis. In collaboration with Drs. Epstein, Johnson, and Edward E. Fischel of the Bronx Hospital, studies are in progress applying the technique of continuous filter paper electrophoresis to the isolation and purification of substances of biologic interest. A clinical study was completed by Dr. Larson

on the relation of the "postcommissurotomy syndrome" to the rheumatic state.

Professor Joseph C. Turner has initiated studies of snake venom hemolysis. During the last year Dr. Helen M. Ranney has continued work on the abnormal hemoglobins. A study of the incorporation of isotopic iron into two varieties of hemoglobin in the same individual has been instituted.

Dr. Kermit L. Pines, with Dr. Neuberg, is comparing vibratory sensation in diabetic and nondiabetic patients. Dr. Pines is also carrying out clinical trials with orally administered sulfonamides which produce decreases in blood sugar. Dr. Pines is also extending balance studies in patients with sarcoidosis in an effort to explain the mechanism of hypercalcemia. Dr. Calvin H. Plimpton continued chemical analyses of bones of rats by the administration of cortisone. With the assistance of Miss Gertrude Merrill the effects of parenteral strontium of bone were investigated.

Professor Alvan L. Barach, with the collaboration of Dr. Gustav J. Beck, Professor Hylan A. Bickerman, and Dr. Mato L. Marinovitch, has studied continuous positive pressure breathing (CPPB) as a method of relieving the dyspnea of pulmonary emphysema and bronchial asthma and in dealing with respiratory difficulties in poliomyelitis. Professor Barach, with the collaboration of Professor Bickerman and Professor Samuel Graff of the Department of Biochemistry, has been investigating the acclimatization to hypoxia of the growth of experimental tumors. Professor Barach's continuing studies on the exsufflator have more clearly outlined its value and its limitations.

Research in the allergy clinic has been devoted primarily to the determination of histamine in the plasma and urine in various allergic states, and to the quantitative study of histamine release from the cells into the plasma during the allergic reaction. These studies have been carried out jointly between Professor William B. Sherman and Dr. Paul P. Van Arsdel, Jr., a visiting fellow.

In the myasthenia gravis clinic, in collaboration with Professor Paul F. A. Hoefer and Dr. Lewis P. Rowland of the Department of Neurology, Dr. Henry Aranow has completed a long-term evaluation of octamethylpurophosphoramidate (OMPA) in the treatment of myasthenia gravis. In the thyroid clinic Dr. Aranow, with Dr. Robert M. Day of the Department of Ophthalmology, has continued studies on the natural history of patients with ophthalmopathy associated with Graves' disease and treated with anti-thyroid agents. In collaboration with Professor Morton M. Kligerman of the Department of Radiology, a study of the effects of pituitary irradiation on ophthalmopathy and thyroid function in hyperthyroid patients has been undertaken. During the past year Professor Charles A. Flood and Dr. Michael J. Lepore completed a long-term study of the prognosis in non-specific ulcerative colitis in collaboration with Dr. Robert B. Hiatt of the

Department of Surgery and Dr. Aaron Karush of the Department of Psychiatry. With Dr. John A. L. Mathers, a study of the motor mechanisms involved in the production of esophageal pain has been undertaken.

During the past year the constitution laboratory under the direction of Professor William H. Sheldon has been principally concerned with a study of women with cancer of the reproductive system. The collection of data for the study of 100 pairs of adult twins has been completed by Dr. Richard H. Osborne. A total number of 207 Columbia graduates of the classes of 1918-1923 have come into the laboratory for the follow-up study and resomatotyping.

AT BELLEVUE HOSPITAL

The new laboratories mentioned earlier in this report are now in use and an augmented research program has been inaugurated. Using the technique previously developed for measuring the blood flow through each lung separately, experiments have been undertaken which appear to have proven definitely a vasomotor activity in the human lung. In these experiments Professor André Cournand, Dr. Aaron Himmelstein, and Dr. Harry W. Fritts have been assisted by Dr. Peter Harris, visiting fellow from London, and Dr. James Odell, visiting fellow from the University of Iowa. Professors M. Irené Ferrer and Rejane M. Harvey, and Dr. Robert H. Wylie, are continuing their long-term study of patients who have had mitral commissurotomy.

Dr. Elmer Alpert and Dr. Robert A. Shimm have conducted a quantitative study of blood levels, excretion, and clinical tolerance of the new antibiotic cathomycin. Dr. Enoch J. Saphire measured arterial oxygen saturation in a series of cases of acute myocardial infarction.

Fourth-year teaching continued as a major activity of the visiting staff. Professor Harvey was in charge of teaching of second-year physical diagnosis. These students also visited the Manhattan Veterans Hospital in order to see and examine additional clinical material. Professor Cournand and staff gave a lecture series on pulmonary physiology to the students and house staff, which extended through most of the year. The evening lecture series, in collaboration with the Second Medical Division, continued, with lectures by Professors David P. Barr, Aaron Kellner, and Walsh McDermott of Cornell and Professors Stanley E. Bradley, Sidney C. Werner, and Charles A. Ragan of Columbia. The outpatient service benefited greatly by the opening of the new chemical and x-ray laboratories.

The course for fourth-year students on the chest service under Professor John H. McClement, has been slightly altered. An attempt has been made to bring the students into even closer contact with the clinical material of the service. At the beginning of each month, the students are introduced to the service and are given information in a series of lectures and demonstrations on various clinical, pathologic, and physiologic aspects of the work.

After three days of introductory material they are assigned to the various wards in small groups and their instruction is integrated with patient care and house staff education to the fullest possible degree. This slight change in the teaching program has been well received by the students and staff. The second-year course in physical diagnosis under Professor Yale Kneeland has been conducted as in previous years. The training of interns and resident physicians continues to be a major activity of the service.

Professors J. Burns Amberson, McClement, Julia M. Jones, and Marvin Kuschner, and Drs. Henry G. Schaffeld and James T. T. Chien have continued their studies on the morphologic, bacteriologic, and chemical characteristics of resected tuberculous lesions after chemotherapy and other forms of treatment.

The special project of home care of tuberculosis has continued under the supervision of Professor Jones and Dr. Frances S. Lansdown. Emphasis during the coming year will be focused on a coordinated program of patient education, further survey of household contacts of patients, and clarification of criteria for selection of patients for home care. Professor Jones and Dr. Robert R. Henderson have initiated a long-term study of results of treatment of tuberculous pleurisy, pericarditis, peritonitis and lymphadenitis. Patients will be followed at Ray Brook Sanatorium and in the Bellevue Out-Patient Department for a period of five years. Studies have continued on tuberculosis of the female genital tract. This is a cooperative project with the Department of Obstetrics and Gynecology under Drs. Robert G. Douglas and Henderson, and Professor Jones.

The emphysema clinic in the Out-Patient Department under the supervision of Dr. Walter L. Evans has continued to grow.

AT FRANCIS DELAFIELD HOSPITAL

Professor Alfred Gellhorn has completed a two-year study which demonstrates that cigarette tar has cocarcinogenic properties. With Professor Margaret B. Murray of the Department of Anatomy and Professor Erich Hirschberg of the Department of Biochemistry, Professor Gellhorn has continued investigations on the chemotherapy of brain tumors. A number of clinical evaluations of drugs in the chemotherapy of human neoplastic disease have been completed by Professor Gellhorn and his colleagues at the Francis Delafield Hospital. Professor Jack D. Davidson and Professor Philip Feigelson of the Department of Biochemistry have continued their investigations on the effects of anti-tumor drugs upon nucleic acid metabolism. Professor Feigelson has continued his studies on adaptive enzyme formation in mammals and has shown that xanthine oxidase activity is elevated in regenerating liver. Dr. George A. Hyman, together with Drs. John E. Ulmann and Winthrop Fish, has continued studies on the mechanism of anemia in patients in neoplastic disease. With Professor Algernon B. Reese of the Department of Ophthalmology, Dr. Hyman has evaluated

the combination of chemotherapy and radiotherapy in the treatment of retinoblastoma in children.

Dr. Paul A. Marks, in association with Dr. Jonathan S. Bishop, has investigated carbohydrate metabolism in tumor-bearing hosts. Studies of glucose oxidation in rats with experimental tumors are in progress. In collaboration with Professor Feigelson, Dr. Marks has investigated ribose biosynthesis in rat liver *in vivo*. Drs. Marks and Bishop, in conjunction with Dr. Henry O. Heinemann of the Department of Physiology of New York University College of Medicine, studied the relationship of solute load to water excretion in patients with diabetes insipidus.

Dr. Elliott F. Osserman has extended his study of the alterations in serum proteins in patients with neoplastic disease. Particular attention has been given to the abnormalities observed in multiple myeloma. In conjunction with Professor Samuel Graff of the Department of Biochemistry, isotope studies of the dynamics of synthesis and degradation of myeloma serum and urine proteins have been carried out. Dr. Osserman and Dr. Robert A. Fishman of the Department of Neurology have been investigating the protein components of human cerebro-spinal fluid.

AT GOLDWATER MEMORIAL HOSPITAL

The Columbia University Research Service at the Goldwater Memorial Hospital has one hundred beds and a group of laboratories in which investigation is conducted in such long-term illnesses as atherosclerosis, hypertension, cirrhosis of the liver, chronic nontuberculous pulmonary disorders, rheumatoid arthritis, and glomerulonephritis. Fourth-year students continue to serve as clinical clerks on the research service, and ward facilities of the entire hospital are made available for the eight sessions in the course on physical diagnosis conducted by Professor Yale Kneeland.

Professor Forrest E. Kendall, Professor Margaret Bevans of the Department of Pathology, and Dr. Liese L. Abell of the Department of Biochemistry have continued their investigation of experimental canine atherosclerosis produced by the feeding of high cholesterol diets and thiouracil.

Dr. Abell and Professor Erwin H. Mosbach have continued their studies of sterol balance and bile acid excretion in dogs and rabbits maintained on diets varying in sterol and fat content. In collaboration with Professor Arthur R. Wertheim, Professor Mosbach and Dr. Abell have carried out a cholesterol balance study in a man. Professor Mosbach has completed an investigation of the bile acid composition of the gall bladder bile of dogs maintained on high cholesterol or high cholesterol plus thiouracil regimens. These studies are being continued in the hope of elucidating the mechanism of gallstone formation in different mammalian species. Professor Mosbach has completed studies on the effect of the long-term administration of bile acids on the serum lipid patterns of dogs and human beings. In collaboration with Professor John J. Burns of the New York University

Research Service, Goldwater Memorial Hospital, Professor Mosbach has continued studies on the biosynthesis of vitamin C.

Professor Alfred Steiner and Dr. Seymour Dayton have produced a hyperlipemia and early atherosclerosis in rabbits by feeding a high vegetable fat diet made up of ground peanuts and purina chow. Professor Steiner and Dr. Fletcher P. Riley have completed their studies on the effect of a plant sterol, sitosterol, on the serum lipid content of individuals with coronary atherosclerosis. Professor Steiner is continuing his investigation of the effect of esterogenic hormones on the serum lipid pattern and clinical course of patients with coronary atherosclerosis.

Professor Wertheim has initiated a study of factors that influence dietary fat absorption in man and the dog. An attempt is being made to develop a fat tolerance test that will be comparable to glucose tolerance tests.

Dr. Henry Lax and Dr. Arthur W. Feinberg are continuing their studies on the changes in the arterial pulse wave contour that takes place in the presence of clinical evidence of arteriosclerosis or hypertension. This study is being carried out in cooperation with Professors Bevans and Kendall.

Professor Quentin B. Deming, Dr. Marie M. Daly, Dr. Marion E. Hodes, Dr. Juan G. Edreira and Professor David Seegal have continued their appraisal of certain drugs employed in the treatment of hypertensive vascular disease. The influence of these agents on plasma lipid patterns and the atherosclerotic complications of hypertension are being studied. Professor Deming, Professor Mosbach, Dr. Daly, Professor Bevans, and Dr. Abell are investigating the effect of experimental hypertension on this form of dietary murine atherosclerosis. Dr. Daly and Dr. Esmeralda Gurpide are investigating the enzymatic characteristics of arterial muscle in hypertensive and normotensive rats and are also studying the effect of reserpine on hypophyseal function.

Professor Deming with Dr. Bernard B. Brodie of the National Heart Institute, Dr. Donald F. Bogdanski, Dr. Sidney Udenfried, and Dr. P. A. Shore studied the blood pressure in the rabbit and body temperature in the mouse after the administration of reserpine.

Studies on the digital circulation in hypertension have been extended by Professor Milton Mendlowitz, both at the Mount Sinai Hospital and at the Goldwater Memorial Hospital. Dr. Saul Cohen, Professor Arthur J. Patek, Jr., Dr. Ernest Schmatolla, and Professor Bevans studied the recovery phase of experimental nutritional cirrhosis. By means of partition chromatography and ultraviolet spectroscopy, Dr. Daniel Rudman and Professor Kendall have identified bile acids in the sera of patients with liver disease. The nature of the dihydroxy bile acid of the serum of the patient with cirrhosis and the serum bile acid pattern in patients with various other hepatic disorders, are now under study.

Professor Hylan A. Bickerman, Dr. Elaine German, Dr. Burton M. Cohen and Miss Sylvia E. Itkin are continuing their studies on the air-flow

dynamics of the normal and experimentally induced cough in human subjects. By determining the threshold response to varying concentrations of inhaled citric acid aerosol, the anti-tussive activity of synthetic cough suppressants is being evaluated. With Dr. Shivaji B. Bhonslay of the Department of Surgery, they are seeking to determine whether the inhalation of 100 percent oxygen will result in death due to oxygen toxicity despite the presence of a normal arterial oxygen saturation. Professors Alvan L. Barach and Bickerman, Dr. Gustav J. Beck and Miss Itkin are studying the effect of continuous pressure breathing in patients with bronchospastic disease. Professor Bevans and Professor Beatrice C. Seegal of the Department of Microbiology are investigating the localization in rat tissue of specific antibodies to certain rat organs.

DEPARTMENT OF MICROBIOLOGY

Professor HARRY M. ROSE, Executive Officer

Mrs. Frederick Parker Gay generously donated funds for a scholarship in memory of her husband, who was executive officer of the department from 1923 until his untimely death in 1939. The Frederick P. Gay Scholarship provides assistance for one or more students from the outset of their course of instruction and will give invaluable support to the graduate teaching program.

During the year nine graduate students were engaged in work at various stages toward completion of requirements for the Ph.D. degree.

The laboratories of the diagnostic service performed 94,409 examinations, of which 30,567 were serological tests for syphilis, a total increase of 12,170 examinations over the preceding year. Although all types of procedures contributed to this increase, the great majority were tests for bacterial sensitivity to antibiotics.

Weekly seminars were held for the graduate students and each of the advanced students was responsible for conducting two or more of these exercises. Professor Bernard F. Erlanger gave a series of six lectures on proteins. Visiting lecturers included Professor Walter T. J. Morgan, Lister Institute, London, England; Professor Otto Westphal, University of Freiburg, Germany; Professor Howard K. Schachman, University of California; Professor Hajume Masamune, Tohoku University; and Professor Tomio Ogata, University of Tokyo, Japan.

Professor Harry M. Rose was appointed to the New York State Board of Medical Examiners and to the national membership committee of the Society for Experimental Biology and Medicine. In collaboration with Professor Erlanger, Professor Calderon Howe, Dr. Alice W. Knox, and Dr. Councilman Morgan, he continued studies concerning natural resistance to viral infections of the respiratory tract, immunization against influenza,

experimental chemotherapy of viral infection, and the structure and development of viruses as revealed by the electron microscope.

Professor Claus W. Jungeblut, in association with Professor Franz J. Kallmann of the Department of Psychiatry and Dr. Harold Goodman of Michigan State College, continued his studies on the genetic background of the secretion pattern of a salivary receptor-destroying enzyme. With Dr. Gonzalo Bautista he continued his studies with Type I poliomyelitis virus. Studies on the in vitro adsorption of MEF poliomyelitis virus to human red cells were continued with Dr. Bautista and Dr. Helen Kodza. In association with Drs. Kodza and Bautista, an as yet unidentified hemagglutinin was discovered in the stools of poliomyelitis patients.

Professor Beatrice Carrier Seegal, Dr. Konrad Hsu, and Mrs. Margo Hasson, in association with Professor Margaret Bevans of the Columbia Research Service at the Goldwater Memorial Hospital, studied the antigenic relationships of rat tissues. Other rat organ antisera were prepared for testing by Coons' technique, including rabbit antirat-lung, antirat-walker carcinosarcoma, duck antirat-kidney and antirat-glomerular sera. In association with Professor Forrest E. Kendall of the Columbia Research Service at the Goldwater Memorial Hospital, and Professor Bevans, alpha and beta lipoproteins from human serum were prepared for use in the production of specific antibodies.

Professor Dan H. Moore continued to collaborate with several members of the department in investigating the fine structure of tissues and viruses by means of the electron microscope. Areas of investigation included viruses, experimental pathology of muscle, and mouse mammary carcinoma, both from the animal and from in vitro cultures. An attempt was also made to characterize the milk agent further by means of ionizing radiation and by diffusion. A detailed comparison of optical methods for electrophoretic analyses was carried out.

Professor Howe extended his work on the fractionization of human erythrocytes to include purification of blood group A substance and immunochemical studies of soluble non-hemoglobin proteins lacking blood group activity. In collaboration with Professors John D. MacLennan and Elvin A. Kabat, work on the enzymes of *Clostridium tertium* was continued and several enzyme specificities (blood groups A, M, and N; pan-agglutination; receptors for Columbia SK virus hemagglutinin) were more closely examined. The investigation of various soluble inhibitors of influenza virus hemagglutination was carried forward. In collaboration with Mr. Abraham Rosenberg and Professor Erwin Chargaff of the Department of Biochemistry, studies were conducted on brain mucolipids, from various animal species, found to have inhibitory capacity for influenza virus hemagglutination and differing in their reactivity with different serologic types of virus. In collaboration with Professor Rose, tissue-culture facilities were established and studies on viruses of the ARD (APC) group were begun.

In collaboration with Dr. Morgan, and with Professor Gabriel C. Godman and Dr. David P. Bloch of the Department of Surgery, electron microscopic and cytochemical studies on HeLa cells infected with viruses of the ARD group were carried out.

Professor Erlanger synthesized several decapeptides related structurally to gramicidin S as part of a program to determine the structural characteristics responsible for the antibacterial action of this antibiotic. In collaboration with Professor Rose, fifty-three synthetic peptides were tested for antiviral activity against a system containing influenza virus and surviving allantoic tissue. In collaboration with Dr. Sam M. Beiser, Professor Frederic J. Agate, Jr., of the Department of Anatomy, and Professor Seymour Lieberman of the Department of Obstetrics and Gynecology, a study of steroid hormone-protein conjugates was continued. Testosterone-17, testosterone-3 and cortisone-21-succinyl bovine serum albumin were characterized chemically and electrophoretically.

Dr. Morgan continued his studies of viral structure and virus cell relationships by electron microscopy. Serial sections of gypsy moth, fowl pox, and vaccinia viruses revealed structure at consecutive levels and permitted detailed reconstruction in three dimensions. Stages in viral differentiation, crystallization and release, as well as destruction of the host cell, were studied in cultures of human cancer (HeLa) cells. In collaboration with Professor Barbara W. Low and Dr. Peter R. Pinnock of the Harvard Medical School, the crystalline structure was determined. In collaboration with Dr. Bloch and Professor Godman, the viruses were shown to contain deoxyribonucleic acid (DNA). Histochemical studies with the light microscope, as well as further investigations of viral development in the electron microscope, are being extended to other members of this new viral group.

Dr. Sam M. Beiser extended his investigations on the role of DNA in pneumococcal transformations in collaboration with Dr. Aaron Bendich and Dr. Herbert Pahl of the Sloan-Kettering Institute. Studies of steroid-protein complexes, in collaboration with Professors Erlanger, Lieberman, and Agate, were continued. In collaboration with Dr. Solon A. Ellison the effect of ultraviolet light on pneumococci and on transformation was studied.

Dr. Stuart W. Tanenbaum spent the summer of 1955 as a visitor in the laboratory of Professor Edward L. Tatum, Stanford University, where a study of fungal aromatic biosynthesis was under way. Together with Dr. Beiser, an immunochemical approach to the study of induced enzyme formation with special reference to the site of action of the inducing substances was developed. Dr. Margaret Holden continued to investigate the effect of adrenocortical steroids on cells in vitro. The effect of hydrocortisone on the ability of fibroblasts to support the growth of vaccinia virus was also studied. Dr. Ellison extended his studies of the effects of ultraviolet light on bacteria. Photoreversal of the lethal effect of ultraviolet irradiation was examined in a number of bacterial species.

DEPARTMENT OF NEUROLOGICAL SURGERY

Professor J. LAWRENCE POOL, Executive Officer

Members of the department have again been active in teaching, which has included a course of lectures to the fourth-year medical students as well as regular teaching conferences and rounds with the residents. Professor J. Lawrence Pool also presented five lectures in clinical neuroanatomy to the first-year class in neuroanatomy, while other members of the department have given lectures to graduate nurses.

Professor Pool has continued his interest in the use of hypothermia during operations for intracranial aneurysms. Cardiac changes during intracranial surgery have been studied both in the operating room and laboratory, and the application of stereotaxic techniques for the treatment of selected cases of advanced intractable tremors has been pursued. The effects of hypophysectomy for the treatment of mammary carcinoma are currently under investigation.

Professor Edward B. Schlesinger has been active in research projects on the localization of brain tumors with radioactive isotopes, in conjunction with Professors Juan M. Taveras, Edith Quimby, and Harald H. Rossi of the Department of Radiology; the correlation of enzyme activity of meningiomas and their rate of growth with Dr. Henry R. Liss; and a study of hydrocelic mechanisms in abnormal arteriovenous cerebral connections. At the Institute for the Crippled and Disabled, Professor Schlesinger is carrying out a study of pharmacological agents in dyskinesias and is preparing a film showing the effects of muscle relaxants on motor disorders.

Professor Lester A. Mount has studied the collateral circulation of the brain by arteriography; spontaneous subarachnoid hemorrhage and intracranial aneurysms; and the results of operative therapy for premature synostosis of the cranial sutures.

Professor Fritz Cramer has completed a myelographic study of the cervical spinal cord and nerve roots in patients with cervical tumors and ruptured discs, with Dr. Frank Hudson of the resident staff.

Professor Joseph Ransohoff is investigating the effects of implanted electrodes in the mesial frontal cortex of the brain for stimulation and recording purposes in conjunction with the administration of tranquillizing drugs before and after lobotomy. Animal studies directed at an approach to problems of hypothalamic physiology in relation to mental illness are also under way. In addition, he has continued studies on the production of cerebrospinal fluid by radioactive tracer techniques, with Dr. Robert A. Fishman of the Department of Neurology; the clinical evaluation of ventriculo-pleural anastomoses for the treatment of hydrocephalus; and the treatment of uncontrollable seizures in children and young adults by various

surgical procedures, including hemispherectomies, with Professor Sidney Carter and Dr. Melvin D. Yahr of the Department of Neurology.

Professor Thomas J. Bridges has continued work on the cerebral circulation by a plethysmographic technique; the behavior of radioactive tracer substances following injection into the carotid circulation of patients with recurrent malignant brain tumor; and lobotomy for relief of pain in terminal carcinoma patients.

Professor James B. Campbell has been responsible for the following research projects carried out in the neurosurgical laboratory: investigation of the innervation of the musculature of the urinary tract, the development of apparatus for the stereotaxic use of radioactive isotopes in patients afflicted with certain dyskinetic states, and the development of a technique for bridging gaps in peripheral nerves and prevention of neuroma formation in amputation stumps.

Dr. James W. Correll has been active in the following research projects: study of peripheral neuritides with experimental studies on "allergic" neuropathies in animals, with Dr. Howard Tucker, clinical fellow, Department of Neurology; an evaluation of endocrinological changes on experimental brain tumors in animals, with Professor Pool; and studies of the influence of the central nervous system on lipid metabolism.

Dr. Dominick P. Purpura has worked during the year on a long-range program of basic research in the field of experimental neurophysiology. The following projects have been investigated and reported on: electrophysiological studies on the mechanism of action of the psychotogenic agent, lysergic acid diethylamide (LSD), consisting of an analysis of the effect of LSD on specific and nonspecific afferent systems in the cat; studies on the cortical mechanisms of the electroencephalogram (EEG) activation accompanying behavioral arousal; and neurohumoral factors associated with reticulo-cortical activity. Most of these studies have been designed to clarify the important role of dendritic activity in electroencephalogram phenomena in paroxysmal and LSD-induced experimental states, and are aimed ultimately at a better understanding of mental illness and its therapy.

Dr. Frank Hudson, a resident, has participated in Professor Cramer's myelographic study of the cervical canal, while Dr. Laibe A. Kessler, a resident, has been active in investigating electrocardiogram (EKG) changes that may occur during intracranial surgery. Dr. Hubert L. Rosomoff, a resident on leave of absence, continued his experimental work on hypothermia and was invited to speak at the meeting of the Royal Society of Medicine in London in February, 1956.

DEPARTMENT OF NEUROLOGY

Professor H. HOUSTON MERRITT, Executive Officer

The activities of the department have continued along the same lines as the previous year. The postgraduate training program at the Neurological Institute has been expanded. The undergraduate teaching program under the direction of Professor Carmine T. Vicale was recognized by the Class of 1956 when they honored Professor Vicale by dedicating their yearbook to him.

As in former years a number of American and foreign fellows have received clinical and laboratory training in the department. Professor Fuad Sabra of the American University of Beirut, Lebanon, was with the department for nine months and Professor Nitya N. Gupta, University of Lucknow, India, for three months as fellows of the Rockefeller Foundation. Professor Vesselin Savic of Belgrade, Yugoslavia, is spending a few months at the Medical Center studying advances in American neurology and psychiatry. Dr. Patrick F. Bray, fellow of the National Foundation for Infantile Paralysis, and Dr. Richard J. Allen, fellow of the United Cerebral Palsy Associations, have been working with Professor Sidney Carter in pediatric neurology.

The electroencephalographic laboratories at the Neurological Institute under the direction of Professors Paul F. A. Hoefer and Eli S. Goldensohn have been host to a number of graduate students from this country and abroad. In addition, neurological residents have been regularly assigned to the laboratory for basic instruction in electroencephalography and electromyography. The formal course on basic and applied neurophysiology has been enlarged to fifteen lectures; Professor Hoefer, Professor Goldensohn, Dr. Joseph Moldaver, Dr. Dominick Purpura of the Department of Neurological Surgery, and Mr. Leonard Zablow contributed lectures and each took part in a panel discussion at the close of each lecture.

Professor Hoefer has again arranged a course in clinical neurology for the basic science training program for orthopedic residents from various hospitals in New York City. Members of the department and Professor Tiffany Lawyer, Jr., of Montefiore Hospital took part in the lectures and case demonstrations.

Professor Hoefer delivered the guest lecture before the American Congress of Physical Medicine and Rehabilitation. With Dr. Henry Aranow, Jr., of the Department of Medicine, he has continued a group of investigations on myasthenia gravis. In view of the discovery by Professor Irwin B. Wilson of new chemical substances capable of restoring enzyme activity after an otherwise lethal dose of anticholinesterase, the effects of alkylphosphate anticholinesterases are still under investigation. A new problem in this field

is that of myasthenia gravis occurring after surgical removal of thymomas.

Professor Goldensohn and Dr. Robert Katzman of the resident staff are investigating direct current potential distribution and changes in the brain, especially in relation to brain metabolism. Professor Goldensohn and Mr. Zablow have continued work aimed at developing a method for recording of respiratory patterns by impedance changes. Professor Goldensohn with Professor Morris J. Frumin and Dr. John Schweiss of the Department of Anesthesiology is continuing study of the electroencephalogram during anesthesia and during hypothermia. A preliminary report on this work has been published. Professor Goldensohn is participating in a study with members of the Department of Psychiatry on electrical recording and stimulation within the brain substance.

Immediately after the first of the year, the pediatric neurology service, under Professor Sidney Carter, transferred its activities to Babies Hospital. This move has led to an increased number of beds being made available to the neurological section and has made for more intimate contact with the pediatricians and their problems. It has also given our department increased duties in that formal lectures and bedside teaching in pediatric neurology are given to the nurses and the medical students at the Babies Hospital.

Several studies have been completed by the group in pediatric neurology. Dr. Labe Scheinberg, Professor Dorothy H. Andersen of the Department of Pediatrics, and Dr. Niels L. Low, visiting fellow, have made a study of nasal gliomas. A study of multiple sclerosis in children was completed by Dr. Low and Professor Carter. Dr. Labe Scheinberg, Dr. Molly Allensworth, and Professor Carter have completed a paper entitled, "Sciatic Neuropathy Resulting from Antibiotic Injections." Studies are being carried out on the problem of polyneuritis in children by Dr. Julia Schneider, Dr. Low, and Professor Carter. Dr. Bray and Professor Carter are conducting a study on brain stem tumors in children. Dr. Allen and Professor Carter are investigating subdural hematomas in children and are collecting data on the occurrence of Charcot-Marie-Tooth type of neuritis in early childhood.

Professor Carter has been appointed a member of the Neurology Training Grant Committee of the National Institutes of Health. He is also a member of the Professional Advisory Council of the New York City Cerebral Palsy Association and Neurological Consultant to the Cerebral Palsy Clinic in Albany, New York. Professor Carter's research activities include a continued study of new anticonvulsant drugs and a continued evaluation of the efficacy of hemispherectomy in the management of patients with infantile hemiplegia and uncontrolled seizures. This latter investigation is being carried out with Professors Melvin D. Yahr and Joseph Ransohoff of the Department of Neurological Surgery.

Professor William F. Caveness, in association with Dr. Aaron J. Beller, Dr. James MacD. Watson, and Dr. Henry R. Liss, has continued the follow-up phase of the study of head injury from Navy and Marine casualties of

the Korean conflict. The Veterans Administration and the American Red Cross are collaborating in this study. In association with Professor Nicholas Kopeloff from the Department of Microbiology, Dr. Lenore M. Kopeloff of the Department of Psychiatry, Dr. Joseph G. Chusid of St. Vincent's Hospital and Dr. Gertrude Van Wagenen of Yale University School of Medicine, Professor Caveness is making an attempt to induce seizures in infant rhesus monkeys by the injection of alumina cream into the cerebral cortex. In association with Dr. Melvin B. Robbins, Professor Caveness has made a comprehensive evaluation of convulsive seizures coincident with sleep in twenty-one human subjects.

The training program in neuropathology was continued under the direction of Professors Abner Wolf and David Cowen, together with Dr. Mavis Kaufman and Dr. Lucretia Allen. It is planned that all of the trainees will receive the benefit of the neuropathological material at the Medical School and at the New York State Psychiatric Institute. Professor Hirotosugu Shiraki of Tokyo University Medical School was a fellow in neuropathology.

Dr. Kaufman has completed her studies of toxoplasmosis in man with Professors Wolf and Cowen; allergic encephalomyelitis in monkeys with Professors Wolf and Elvin A. Kabat; and of *Trypanosoma cruzi* infection in Indian monkeys with Professor Wolf. Professors Cowen and Wolf have published an extensive study on cerebral atrophies and encephalomalacias in infancy and childhood. Professors Wolf and Cowen and Dr. William Antopol of Beth Israel Hospital, New York City, are reporting the results of their studies of the reduction of neotetrazolium by neural tissue. Experimental work in reproducing the effects of birth injury and of severe repeated convulsions in infancy are being carried forward by Professors Wolf, Cowen, and Dr. Lester Geller. Professor Irwin H. Feigin is studying the occurrence of sarcoma formation within glioblastomas. Professor Feigin has been appointed associate professor of neuropathology at the New York University School of Medicine.

Dr. Lewis J. Doshay continues to test new drugs in the treatment of paralysis agitans. Dr. Doshay and Professor Frederick J. Agate of the Department of Anatomy have continued their work on the construction of instruments for the measurement of rigidity and tremor in order to determine the effects of drugs on these symptoms.

Professor Elvin A. Kabat is continuing work on the relationship between immunochemical specificity and chemical structure of various antigens. Professor Kabat and Miss Ada E. Bezer have been carrying out a study using a series of dextran fractions of varying molecular weight to determine the lowest molecular weight dextran which would be antigenic in man.

Mr. Peter Z. Allen and Professor Kabat have been studying the kinds of antibody formed to dextrans with varying proportions of non 1→6 linkages. Mr. Joel Goodman is working with Professor Kabat on a study of the cross reactions of various dextrans with antipneumococcal horse serum.

Another major area of investigation involves the chemistry of the blood group A B and O substance. In January, 1956, Academic Press published a book by Professor Kabat entitled, *Blood Group Substances: Their Chemistry and Immunochemistry*, which summarized work in this area up to that time. Dr. Mary E. Carsten, now at the University of California at Los Angeles, and Professor Kabat have studied the amino acid composition of the blood group substances. Professors Kabat and Calderon Howe of the Department of Microbiology have studied the purification of blood group A and O substances from hog gastric mucin, and with Professor John MacLennan of the Department of Microbiology have been studying the way in which enzymes from *Clostridium tertium* break down blood group substances.

Dr. Gerald Schiffman of the Department of Microbiology, and Professor Kabat are attempting to determine the structure of the oligosaccharides responsible for blood group A and B specificity taking advantage of the liberation of oligosaccharides by mild acid hydrolysis which have residual activity as assayed by inhibition of A anti-A and B anti-B precipitation.

Dr. Frederic C. McDuffie and Professor Kabat have completed a study of antibodies to A and B substances in various human antisera with respect to whether or not they give a positive Coombs test beyond the agglutination end point as titered in saline. Dr. McDuffie and Professor Kabat are investigating the relationship between gamma globulin and human anti-A using antisera prepared in rabbits to A anti-A specific precipitates; anti-A is considered to be of higher molecular weight than ordinary gamma globulin.

Professor Kabat was invited to participate in a symposium at the Second International Congress of Allergy at Petropolis, Brazil, in November, 1955. In addition, talks on blood group and on dextrans were given by Professor Kabat before the American Chemical Society sections in New York, Philadelphia, and Pittsburgh and at the New York State Department of Health, Albany.

Professor Frederick A. Mettler has continued his studies on the physiology of the cerebellum and the basal ganglia. With Dr. Fernando L. Orioli he has determined the effect of section of the rubrospinal tract, the restiform body, and the olivary decussation. Professor Mettler, Drs. Henry R. Liss, and George H. Stevens of the Veterans Administration Hospital, Bronx, New York, have made a study of the blood supply of the striopallidum. Professor Mettler, Dr. Liss, and Mr. Waller V. Morgan have devised a method for the permanent implantation of electrodes in the spinal cord of animals for the purpose of obtaining spontaneous action potentials. Professors Mettler, Grundfest, and Dr. Orioli have traced the spinal course of the descending limb of the brachium conjunctivum and its interrelation with the rubrospinal system.

Professor Harry Grundfest has previously demonstrated that the membrane which generates the spike in conductile cells is capable of being

transformed to produce only graded responses which are propagated decrementally for short distances. New work by Professor Grundfest and Dr. C. Y. Kao of the State University of New York has established the existence of the same property in giant fibers of the earthworm, crayfish, and squid. The phenomenon has now been analyzed and appears to be related to a similar change which can be produced at synapses by certain drugs.

A theory was proposed in 1954 that the cell membrane which is involved in synaptic transmission is not electrically excitable. Work in Professor Grundfest's laboratory has confirmed the theory on a variety of central and peripheral synapses. This theory has led to a number of new findings in the central nervous system of invertebrates and mammals. Studies by Professor Grundfest and Dr. Dominick P. Purpura of the Department of Neurological Surgery have shown that the potentials which are the major components of the electroencephalogram are generated at the post-synaptic membrane of dendrites. Another test of the theory was made by the studies of Professor Grundfest and Dr. Kao by studies on certain giant fibers of the earthworm and crayfish nerve cords.

Dr. Yoshigoro Kuraiwa is engaged in an electrophysiological analysis of the connections of the basal ganglia with other central structures. Dr. Stanley Crain is continuing studies on the electrophysiology of tissue-cultured neurons, a technique which he was the first to use successfully. Work is continuing on the evaluation and properties of local anesthetics by Professor Grundfest and Professors Joseph Fiasconara and Harold Sherman of the Department of Dental and Oral Surgery. Experiments by Professors Grundfest and A. Tyler of the California Institute of Technology, Professor A. Monroy of the University of Palermo, Italy, and Dr. Kao have shown that such a potential exists in eggs of the starfish, its magnitude approximately that predicted from the analysis of the ionic content of the eggs. Fertilization of the egg changes the potential.

Professor Grundfest delivered the first George H. Bishop Lecture at Washington University, St. Louis, on bioelectricity in the nervous system. He also participated in conferences on the microneurophysiology of the synapses at the University of Washington, Seattle; and electronic instrumentation in surgery held by the Medical Electronics Center at the Rockefeller Institute of Medical Research. He also delivered lectures at the California Institute of Technology, Pasadena; the University of California, Los Angeles; the University of Illinois, Chicago; the Marine Biological Laboratory, Woods Hole, Massachusetts; and Wellcome Research Laboratory, New York.

Professor David Nachmansohn and his group continued their studies on the elementary processes underlying the generation of bioelectric potentials and nerve impulse conduction. Electric organs have been used by Professor Nachmansohn during the last twenty years in his investigations, in which many biochemical and biophysical events were correlated. During the last few years Dr. Mario Altamirano has developed microtechniques which made

it possible to use single electroplax for these studies. Dr. Altamirano and Dr. Ernest Schoffeniels, Fulbright Fellow from Liège, Belgium, have developed a preparation to use one single electric cell, an electroplax, for studies in this field. Thus, a preparation has been developed which permits for the first time the direct study of ion flux across the conducting membrane of a single cell. The preparation offers a unique method for the study of chemical and physical factors controlling the ion flux at rest, during activity, and in recovery—the problem paramount for understanding nerve function.

Dr. Max Eisenberg has initiated a program of studies of the enzymes of the glycolytic and citric acid cycles in electric tissue. The newly developed electroplax preparation will be used for these tests.

Professor Irwin B. Wilson has continued his studies on the molecular forces acting in the surface of acetylcholinesterase and on the reaction mechanism between alkylphosphates and the enzyme. He designed a compound, 2-pyridine-aldoxime methiodide (PAM), which was synthesized by Dr. Sara Ginsburg and was found to be more than a thousand times as potent a reactivator of alkylphosphate-inhibited esterase as any previously known. Dr. Helmut Kewitz, Ford Foundation Fellow from the Department of Pharmacology of the Free University, Berlin, tested PAM as an antidote against the insecticide paraoxon and the "nerve gas" diisopropyl fluorophosphate (DFP).

Professor Wilson and Dr. Kewitz have tested the ability of PAM to restore acetylcholinesterase activity in vivo. New methods were applied to determine the intracellular activity of the enzyme.

Dr. H. Claire Lawler developed simplified and standardized techniques for the preparation of highly purified acetylcholinesterase from electric tissue. Dr. Volker Vossius of the University of Munich, Germany, has developed spectrophotometric methods for the identification of the amino groups in proteins with the aid of color-forming coupling agents. Dr. Anne-marie Weber continued her studies on the role of ATP in the elementary process of muscular contraction.

Professor Wilson was invited to a meeting of the Faraday Society in Oxford, England, and gave a report at the Third International Congress of Biochemistry at Brussels. Professor Nachmansohn was invited by the American Chemical Society to give a lecture in Rochester, New York.

Professor Melvin D. Yahr, Professor Kabat, and Dr. William Sibley have studied the effect of hydrocortisone on multiple sclerosis and Schilder's disease with particular attention to alterations in gamma globulin content of blood and cerebrospinal fluid and to the recoverability of corticoids from cerebrospinal fluid. They have also completed a long-term study on multiple sclerosis patients with elevated cerebrospinal fluid gamma globulin.

Professor Yahr participated in conferences on problems in human communication at the National Hospital for Speech Disorders and on the medical aspects of traffic accident prevention at New York University. He

also delivered the Poynter Day Lecture at the University of Nebraska. Professor Yahr is director of the New Jersey State Consultation Service for Convulsive Disorders, a project set up by state and private agencies for rehabilitation of patients and public education in epilepsy.

Professor Daniel Sciarra has continued studies on muscular dystrophy and the evaluation of new drugs in the therapy of convulsive seizures. Drs. Frederic T. Zimmerman and Bessie B. Burgemeister have tested the effect of the so-called tranquilizing drugs on children with behavior disorders and convulsive seizures, and of new anti-convulsant drugs particularly for petit mal epilepsy.

Dr. William Amols is engaged in a clinical study of new compounds for their muscle relaxant properties in patients with spasticity and rigidity and of the effect of the tranquillizing drugs on functional speech disorders.

Dr. Robert A. Fishman has been continuing his studies of the "blood-brain barrier." The influences of the administration of various adrenal steroids, specific enzyme inhibitors, cholinergic and adrenergic drugs, and of changes in the intracranial pressure on this transport rate are now under study. In collaboration with Professor Ransohoff and Dr. Elliot F. Osserman of the Department of Medicine, Dr. Fishman has also continued his study in patients of the exchange of protein between plasma and cerebrospinal fluid. Study of electrophoretic fraction X in spinal fluid with regard to its site of origin is also in progress.

The Division of Neurology at the Montefiore Hospital under Professor Tiffany Lawyer, Jr., continued to carry a major share of the clinical instruction of the third-year students. Dr. Dewey K. Ziegler left the Montefiore Hospital in July, 1955, to become assistant professor of neurology at the University of Minnesota and has been replaced by Dr. Seymour Solomon. Dr. Lewis P. Rowland spent six months at the Medical Research Council Laboratory at Holly Hill, London, England, studying techniques for the measurement of muscle metabolism. Dr. Rowland has also been investigating serum aldolase in patients with progressive muscular dystrophy and has continued, with Professor Hoefer, the evaluation of agents for the treatment of myasthenia gravis.

Professor Arnold P. Friedman has continued with Dr. Percy Brazil of the Department of Neurology at Montefiore Hospital to investigate changes in cranial vasculature in patients with headaches. He is also studying headache in hypertensive patients with Drs. Marvin Moser and Helen Wish and Professor Louis L. Leiter of the Department of Medicine at the Montefiore Hospital; and the role of allergy in headache with Dr. Lucie Adelsberger of the Department of Pathology at Montefiore Hospital. Evaluation of new drugs for the treatment of headache has continued under Professor Friedman's direction. Professor Friedman delivered lectures on headache at meetings of several national and local medical societies.

Professor Lawyer has been studying the action of asparagine in patients

with epilepsy in cooperation with Dr. Donald Tower of the National Institutes of Health.

Professor H. Houston Merritt was named as president-elect of the American Neurological Association and vice-president of the Sixth International Neurological Congress which will be held in Brussels in July, 1957. He delivered lectures at the Universities of Washington, Oregon, and California.

Visitors to the department during the year included Professor George Bishop, Washington University, St. Louis; Professor Hirotsugu Shiraki, Tokyo; Professor Max Minkowski, University of Zurich; Professor A. Brodal, University of Oslo; Professor H. Pette, University of Hamburg; Professor Masaya Araki, University of Kyoto; Professor Sigwald Refsum, University of Oslo; Dr. T. Rowland Hill, London; and Dr. Leonard Kurland, United States Public Health Service, Washington, D. C.

Professors Beverley Chaney and Irving J. Sands retire at the end of this academic year. Both of these men were with the department before the School moved to the Medical Center. They have given unstintingly of themselves and of their time to the development of the department. Dr. Maurice Frocht, who has given faithful service for over twenty-five years, is also retiring.

DEPARTMENT OF NURSING

Professor ELEANOR LEE, Executive Officer

Beginning with registration next September, all of the students enrolled will be candidates for the Bachelor of Science degree from Columbia University as well as for the diploma. The number of applications from college students has shown a steady increase in recent years, which indicates a trend among college students to complete two years of liberal arts as a foundation for their professional education in nursing.

A progressive step has been taken in the announcement of the change in the length of the nursing program effective for the Class of 1957. These students will complete the nursing course in June instead of September. This new program of three academic years and two summers has been arranged for students who have completed sixty points in liberal arts before admission. This change does not apply to the twenty-eight months' course for students who hold a baccalaureate degree acceptable to Columbia University; these students receive advanced time credit and complete the course in January. Thirteen percent of the degree students now enrolled are in this classification.

During the year scholarships have been awarded to fifty students enrolled in the Department of Nursing. The need for scholarship aid for tuition becomes greater all the time. Contributions for scholarship aid were as

follows: the Mother's Club of Maxwell Hall gave six scholarships; the Louise and Gustavus Pfeiffer Foundation provided ten full-tuition and ten half-tuition scholarships awarded for the first time last September; the Vivian B. Allen Foundation provided two full-tuition scholarships to be awarded next September and scholarships to three members of the Class of 1957 and to one member of the Class of 1956. The Mary Sencindiver Specht and the Jane Craig McAllister Scholarships were awarded to members of the Class of 1957. The Margaret E. Conrad Scholarship was given to a member of the Class of 1957, and the tenth award of the Dean Sage Memorial Scholarship was made to a member of the Class of 1958. The Robert Bacon Whitney Memorial Scholarship was given to a member of the Class of 1958; the Florist Telegraph Delivery Association Incorporated, and the Women's Auxiliary for the Florist Association each provided a scholarship. The Columbia University Committee for Community Service provided funds for scholarship assistance. The Class of 1955 donated four scholarships, and eleven scholarships were given by the Alumnae Association of Presbyterian Hospital School of Nursing. Other scholarships from outside sources awarded before entrance were New York State Scholarships, the Florence L. and Clarence L. Lersner scholarships, and the Russian Student Fund, Incorporated, which was awarded for a second year.

Professor Eleanor Lee, the director of nursing of Presbyterian Hospital, was appointed executive officer and professor of nursing under the terms of the new agreement between the University and the Hospital. Professor Helen F. Pettit was promoted to associate professor of nursing and director of nursing education. Miss Mary I. Crawford was appointed assistant professor of nursing assigned to obstetrics and gynecology. Under her able leadership a graduate program in maternity nursing has been developed this year and the educational opportunities in this clinical field have been enriched for the basic students in their twelve weeks' program.

Miss Dorothy E. Reilly was promoted to assistant professor of nursing assigned to curriculum development. Professor Reilly has continued as director of the research program with the assistance of Mrs. Emily S. Malone, appointed in September. Miss Ruth M. Guinter was promoted to assistant professor of nursing, the position previously held by Miss Marion D. Cleveland, who became director of the Nursing Service of Presbyterian Hospital. The resignation of Professor J. Margaret A. Mutch was accepted with regret in June, 1955. Miss Josephine C. Brown was transferred to fill the vacancy for this year.

Other promotions to assistant professor of nursing were Miss Constance C. Hamon and Miss Edith E. Morgan, director of nursing at the New York State Psychiatric Institute. Miss Gertrude Clawson and Mrs. Jeanette W. Sweeney of the New York State Psychiatric Institute were appointed instructors. The close cooperation of Professor Morgan, Miss Clawson, and Mrs. Sweeney in all group planning and participation in committee activities

is a great inspiration to the teaching staff. Miss Angela Del Vecchio and Miss Elizabeth S. Gill were promoted to associates.

The following were appointed instructors in nursing: Miss Eleanor Levin, Miss Rosalie M. Lombard, Miss Elize Poestkoke, Miss Mary L. Mau, Miss Priscilla C. Parke, Mrs. Ruth J. Pilcher, Miss Dorothy E. Robinson, Miss Gilda Mancinelli. Three additional staff appointments were made for members of the teaching staff of Maternity Center Association: Miss Hattie Hemschemeyer, associate director of Maternity Center Association and director of the School of Midwifery, as assistant professor of nursing; Miss Anna M. Noll as instructor in nursing; and Miss Marion Strachen as instructor.

The new graduate program in maternity nursing started in September with four graduate nurses registered for the Master of Science degree. The course is offered by the Department of Nursing in cooperation with the School of Public Health and Administrative Medicine and Maternity Center Association. Upon successful completion of the course in August, these four students will receive a Master of Science degree from Columbia University and a Certificate in Nurse-Midwifery from Maternity Center Association. In addition, two graduate nurses registered in February for the four months' course, which leads to a Certificate in Training in Maternity Nursing from the University. Generous scholarship aid was provided by Maternity Center Association to assist these students with their tuition and expenses.

The research study under the grant from the China Medical Board, Incorporated, has been completed this year. The appointment of Mrs. Emily S. Malone as assistant to Professor Reilly has greatly aided the program; Mrs. Malone participated in the supervision of the seniors' teaching and in the analysis of data. The studies in the clinical field have already influenced the curriculum. The periods of observation in the recovery room and admitting clinic are now integral parts of the student's experience on medicine and surgery. The total study will be published in September and will be available to those interested. This three-year period has seen a large number of faculty members, students, and administrative personnel plan and work together under the research plan. The experience has not only shown them the many fields available for study, but also an approach to methodology.

One hundred and twenty-five students in the Class of 1958 completed successfully the first-year program in medical and surgical nursing. Basic science and nursing were taught throughout the first year with the content arranged to meet the needs of the students as they progress in their clinical experience on the medical and surgical services. Mental health is included in the introduction to nursing and continued in medical and surgical nursing. The correlation of basic science and nursing was accomplished by patient-centered group discussions related to specific clinical conditions. During the spring semester each student was assigned to the admitting

emergency clinic for a day's observation and also to the recovery room.

The development of the learning experiences in the area of public health has been one of the major projects this year. Through the interest and generous effort of Professor Ray E. Trussell and his staff in the School of Public Health and Administrative Medicine it has been possible to introduce public health science early in the nursing course and to correlate it with the sciences offered concurrently. In the spring session public health science was related to specific medical and surgical conditions. The faculty is interested in further study to determine instruction and experience in public health and public health nursing that should be offered a student of basic professional nursing.

The outpatient nursing service has continued to give each student two weeks' experience in visiting patients in their homes. This year one hundred and six students made a total of 3,829 visits to 876 patients. The students also made field trips to social agencies and observed child health services; each student presented a family study at a weekly conference. In addition, seventeen students in the degree section had eight weeks' experience with the Visiting Nurse Service of New York. Eight members of the Class of 1956 spent eight weeks at the Mary Imogene Bassett Hospital in Coopers-town in April and May.

Considerable study has been made also by the faculty members concerned with the curriculum content in the areas of maternity, orthopedic, and pediatric nursing. As a result, the teaching of growth and development has been strengthened and more emphasis placed on mental health, the family unit, and parent education. A four weeks' experience in orthopedic nursing was given this year to every member of the senior class.

A new program of senior experience in general medical and surgical nursing was established this year for each member of the Class of 1956. This eight weeks' experience in the nursing care of medical and surgical patients included team leadership and basic managerial skills, and thirty hours of planned teaching.

Curriculum changes have made possible the shortening of the thirty-six months' course to thirty-three months. Beginning in September with the next academic year, a survey course in basic science and another in nursing have been planned for the first eight weeks. The medical and surgical content will be placed two months earlier in the program for better correlation of theory and practice. The operating room experience has been changed to four weeks instead of six. A pilot study of a four weeks' experience proved successful with one group of students this spring.

Affiliating students in collegiate programs were scheduled in December, March, and May with degree students from the Department of Nursing.

A meeting of Directors of Affiliating Schools was held in Maxwell Hall on

November 18, 1955. Dr. Rustin McIntosh spoke on comprehensive patient care.

At Columbia University Commencement in June the Bachelor of Science degree was conferred on seventy-eight candidates from the Class of 1956 present in cap and gown. The graduation exercises for the Class of 1956 were held in the garden of the Presbyterian Hospital on Thursday, June 7. The address was given by Dr. Wilder G. Penfield, director of the Montreal Neurological Institute, and Dean Willard C. Rappleye gave the class an inspiring message. Mr. W. S. S. Griswold, Jr., secretary of the Presbyterian Hospital, presided. Mrs. Frederic de Rham, member of the Board of Trustees of the Presbyterian Hospital, presented the diplomas and Miss Helen Young, director of nursing emeritus, presented the pins to the one hundred and one graduates.

Miss Hsen-Ling Shen, a graduate of the School of Nursing at the National Defense Medical Center, Taiwan, received the Anna C. Maxwell Fellowship for graduate study and has been a guest in Maxwell Hall since September. On her return to Taiwan this fall Miss Shen will become a clinical instructor in medical and surgical nursing.

The seventh edition of *Lippincott's Quick Reference Book for Nurses* was published in November, 1955. Under the leadership of Professor Lee, a complete revision was made by the following faculty members: Professor Pettit—nursing technics; Professor Reilly—medical and surgical nursing; Professor Allanach—maternity nursing; and Miss Elizabeth S. Gill, associate in nursing—pharmacology.

The dedication ceremony for 130 members of the Class of 1958 was held in Maxwell Hall on January 4, 1956. Dr. Aura E. Severinghaus, associate dean, extended greetings and Dr. F. Randolph Bailey, clinical professor of medicine, gave the address.

Professor Marjorie Peto was on sabbatical leave during the winter session. Professors Lee and Pettit are members of the Columbia University Seminar on the role of the health professions. Professor Pettit and Miss Gill were representatives at the meetings of the Council of Member Agencies of the Baccalaureate and Higher Degree Programs of the National League of Nursing held in Chicago in January; Professor Pettit was also appointed a member of the New York State Board of Nurse Examiners.

Miss Gill completed the revision for the seventh edition of *Pharmacology and Therapeutics*, which will be published by J. B. Lippincott.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Professor HOWARD C. TAYLOR, JR., Executive Officer

A number of important appointments have been made in the staff of the department. Miss Lottie Morrison retired as assistant professor of nursing.

This important position has been filled by Miss Mary Crawford. Miss Crawford's appointment has been accompanied by the development of the graduate program in maternity nursing.

During this year, also, Dr. Gilbert J. Vosburgh was appointed associate professor of obstetrics and gynecology after a broad teaching experience at the medical schools of Western Reserve and Johns Hopkins Universities. Dr. Raymond L. Vande Wiele was appointed an instructor in the department and Drs. Ferdinand H. Flick and Angela-Marie Vedovi as assistants assigned to the Vanderbilt Clinic. Dr. Joel Bitman was appointed research associate on July 1, 1955, to work on steroid chemistry in the laboratory of Professor Seymour Lieberman.

The promotions to be noted are those of Dr. Albert A. Plentl from assistant to associate professor; Dr. Arnold N. Fenton and Dr. David B. Moore from instructor to associate; and Dr. William V. Cavanagh from assistant professor of clinical obstetrics and gynecology to associate clinical professor of obstetrics and gynecology. Dr. Salome G. Waelsch, a research associate with the department, resigned on February 1, 1956, to become associate professor of anatomy at the Albert Einstein College of Medicine. Dr. Thomas C. Peightal, for years clinical professor of gynecology at the Roosevelt Hospital, retired on June 30, 1955.

Visiting fellows in the department during the last year included William I. C. Morris, professor of obstetrics and gynecology at the University of Manchester; Dr. Henrietta Banting of Toronto; Dr. Claude Guy Sureau of France; Dr. Prabhaker Nagardas Shah of Bombay; Dr. René Vanden Driessche from Belgium; Dr. Jean J. Snoeck, professor of obstetrics and gynecology at the University of Brussels; Dr. Kirio Gomes Da Silva of Portugal; Dr. Jean Marchand of France; and Drs. John M. Stavorski and Fernando G. Robleto of Managua. In addition, there were a total of forty-one officially registered visitors from nineteen different countries.

Guest lecturers included Dr. Elizabeth Ramsey of the Carnegie Institute of Baltimore; Dr. T. N. A. Jeffcoate, professor of obstetrics and gynecology at the University of Liverpool; Dr. William Daniel, assistant surgeon in the Memorial Hospital of New York; Professor William I. C. Morris of the University of Manchester; Dr. Roberto Caldeyro-Barcia, head of the section of obstetrical physiology, Faculty of Medicine, Montevideo; and Dr. Clyde L. Randall, professor of obstetrics and gynecology at the University of Buffalo School of Medicine.

The program of the teaching of undergraduate medical students has remained the same in its essentials. The graduate course in maternity nursing leading to the Master of Science degree from Columbia University and a Certificate of Nurse-Midwifery from the Maternity Center Association is now nearing the completion of the first year.

The clinical responsibilities of the staff for the care of the obstetrical and gynecological patients of the Presbyterian and the Francis Delafield Hos-

pitals have remained at about the same level. At the Presbyterian Hospital there were 3,968 deliveries, about one hundred more than in any previous year. There were 1,697 gynecological operations, representing a slight decrease over the average for the three previous years.

The gynecologic service at the Francis Delafield Hospital is gradually increasing its work, there being nearly three hundred admissions last year and over a thousand clinic visits. The serious character of the illnesses for which admission is sought at this hospital obviously magnifies the significance of these figures.

Work on endometrial pathology and on ovarian tumors has continued under the direction of Professor Earl T. Engle. In consultation with Professor Engle and with the assistance of Professor Gerhart S. Schwarz of the Department of Radiology, Dr. Duane W. Todd of the resident staff has begun investigation of the techniques for microarteriography in the uterus in an attempt to study the endometrial blood supply. Dr. Anna L. Southam has continued her work supervising the sterility and endocrine clinic and has reviewed a series of over 1,600 patients treated for infertility from the years 1946 to 1953 inclusive. Dr. Henrietta Banting, Barnes Foster Fellow, has reviewed and analyzed 106 cases of habitual abortion observed in this clinic over the last ten years.

Professor Joseph W. Jailer, working in the Department of Obstetrics and Gynecology, has continued his studies of adrenal function during pregnancy. Working with Professor Jailer are five fellows: Drs. Nicholas P. Christy, Adele Dellenbaugh, Donald Longson, Dorothy Krieger, and Stanley Ulick.

Professor Seymour Lieberman has been continuing his fundamental studies on the steroid hormones of the ovaries, placenta, and adrenals, including the biosynthesis of steroid hormones by means of the perfusion of isolated glands or homogenates of adrenals and placenta with C^{14} labeled materials. This work has been done in association with Dr. Samuel Solomon, Dr. Raymond Vande Wiele, Mr. Paul Levitan, and Miss Carmen Cassanueva. A different type of project related to the steroids has been carried out in collaboration with Dr. Bernard F. Erlanger, Drs. Felix Borek, and Sam M. Beiser of the Department of Microbiology, and Professor Frederick Agate of the Department of Anatomy. This has been the successful preparation of steroid-protein complexes and the investigation of their chemical, immunological, and biological properties. Investigations have also been made into the nature of urinary metabolites related to the newly discovered adrenal hormone, aldosterone. This work has to a large extent been done with Dr. Stanley Ulick.

Dr. Landrum B. Shettles has continued his work on the early stages of human embryonic development and has published in the last year two manuscripts concerned with the maturation, fertilization, and cleavage of human follicular and tubal ova and on the description of the morula stage

of the human ovum developed in vitro. He has also published papers indicating that the sex of the infant may be diagnosed during pregnancy from the nuclear morphology of cells in the human amniotic fluid.

Professor Albert A. Plentl, in association with Dr. Mary Jane Gray, has continued his study of the exchange of water and electrolytes between the maternal organism, the fetus, and the amniotic fluid.

Dr. Louise L. Phillips has continued her research on fibrinogen and the fibrinolytic enzyme systems in pregnancy. Particular interest has been devoted to the condition of so-called afibrinogenemia, which is now evidently the cause of many of the severe hemorrhages which occur during or immediately after labor. Phases of this research have been carried out in cooperation with the Departments of Surgery, Urology, Medicine, and Pediatrics.

The clinical aspects of toxemia of pregnancy have continued to be the objective of work by Professor Alvin J. B. Tillman who published a number of papers on this subject during the year and is working at present on a monograph entitled "Toxemia of Pregnancy."

In Professor Lieberman's laboratory Dr. Jean P. Rosselet and Miss Lillian Overland have continued their investigation of the nature of the corticoids excreted during pregnancy. Dr. Herbert M. Magram, a member of the resident staff, has been continuing with Dr. Michael Lilien studies on the nature of the chorionic gonadotrophin and with Dr. Austin H. Kutscher of the Department of Dental and Oral Surgery has been working on a report of gingival conditions in pregnancy. Dr. Donald R. Reisfield, a resident, has been working on a report of the histological study of placental blood vessel lipids and cholesterol of normal parturients, hypertensives, and pre-eclampsics.

Professor Gilbert J. Vosburgh is setting up a laboratory for systematic studies of the functions of potassium in the pregnant organism and for the study of the placental transmission of various substances.

The correlation of pelvic shapes and diameters, as obtained by x-ray pelvimetry, with the outcome of labor continues under the special direction of Professor Charles M. Steer. He is also beginning a collaborative study with Dr. A. Csapo of the Rockefeller Institute on uterine muscular activity.

Dr. Emanuel Friedman, a senior resident, has continued development of a "graphical statistical" method of evaluating labor by correlating cervical dilatation in labor with the elapsed time of labor. Dr. Friedman has also been studying the relative effectiveness of various oxytocic drugs currently in use as post-partum uterotonic agents. With Dr. James W. Rutherford of the resident staff he has completed a clinical review of forty-two patients associated with lupus erythematosus.

Professor William V. Cavanagh has been carrying out an exhaustive study on the question of prolonged pregnancy or "post-maturity." Professor Steer

and Dr. Claude Sureau have begun a study of methods for the recording of the fetal electrocardiogram. Professor Virginia Apgar, of the Department of Anesthesiology and Dr. Stanley James, a fellow in anesthesiology, are studying the changes in circulation which occur in the newborn during the hours and days after the severance of the umbilical cord has eliminated the placenta as a factor in circulation.

Professor Lieberman and his group are comparing the nature and amount of 17-ketosteroids excreted by normal men and women and by cancer patients. This work is being done with Drs. Joel Bitman, Raymond L. Vande Wiele, and Andrew Granitsas, and Messrs. Meir Goldstein and Joseph Marquez. The large study initiated several years ago to determine the biological and biochemical factors underlying degrees of differentiation or "grade malignancy" has been continued. A study of 208 tumors has now been completed, the majority being various types of carcinomas of the ovary.

Dr. Margaret E. Long has continued cytochemical studies on ribonucleic acid, alkaline phosphatase, succinic dehydrogenase, glycogen, and a number of other substances. Dr. Saul Bader is studying nuclear proteins in the same series of cases and is working with the principle of absorption microspectrophotometry. Biochemical studies of material in these tumors are being conducted in the laboratory at the Francis Delafield Hospital. Dr. Helena de Roeth has been correlating loss of differentiation in gynecologic tumors with metabolic behavior.

The need to find a method which would distinguish the tumors which will react favorably to radiation therapy increases each year. The laboratory of Professor Saul B. Gusberg is devoted principally to this problem and is attempting to compare the relative values of several allegedly successful methods.

The work of Dr. Harold M. M. Tovell in an attempt to transplant human cancer into laboratory animals has continued. To date over sixty neoplasms have been transplanted of which 60 percent survived and grew in properly conditioned animal hosts.

The importance of an accurate follow-up system has been recognized by the establishment of an excellent organization for this purpose under the direction of Dr. David B. Moore. The follow-up clinic of the department is now following over 3,000 living cancer patients treated in this institution.

Under the direction of Dr. Lothar Gidro-Frank of the Department of Psychiatry and with the association of Miss Thelma Gordon, studies have continued on the emotional aspects of pelvic pain of functional or psychiatric origin. Dr. Gidro-Frank has continued to give weekly seminars to the medical students on the psychodynamics of certain obstetrical and gynecological conditions.

Dr. Harold Speert has published, with Dr. Alan F. Guttmacher of the Mt. Sinai Hospital, a book entitled *Obstetric Practice* and published by McGraw-Hill. In connection with the problem of anemia in pregnancy,

Professor Plentl has been making a clinical evaluation of four hematinics in the ante-partum clinic.

Professor Emeritus Benjamin P. Watson delivered the William Meredith Fletcher Shaw Memorial Lecture in London on September 23, 1955, before the Royal College of Obstetricians and Gynecologists. Professor Howard C. Taylor, Jr., attended the annual meeting of the Japanese Obstetrical Society in Tokyo and delivered the opening scientific address on April 2, 1956. At the University of Montevideo in the fall of 1955, Professor Plentl spent some weeks elaborating his experiments on fluid exchange between fetus, mother, and amniotic fluid, and was elected to membership in the gynecologic societies of Chile, Uruguay, and Brazil. Dr. Mary Jane Gray, a Barnes-Foster Fellow, spent most of the year, ending January 1, 1956, at the Radiumhemmet in Stockholm.

Numerous lectures both in the metropolitan area and throughout the country were given by various members of the department. Dr. Arnold N. Fenton was elected a fellow of the American College of Surgeons; Dr. David B. Moore, a fellow of the American Academy of Obstetrics and Gynecology; Professor Plentl, a member of the Council of the Society of University Gynecologists; Professor Landrum B. Shettles, a member of the Harvey Society; and Dr. Equinn W. Munnell, a member of the New York Cancer Society. Professor D. Anthony D'Esopo was elected to fellowship in the American Gynecological Society. Professor Earl T. Engle continues to serve as chairman of the Subcommittee on Steroids and Hormones of the American Medical Association, and Professor Stanley M. Bysshe is a member of the Coordinating Council for Cerebral Palsy.

The *Bulletin of the Sloane Hospital*, under the direction of Professor D'Esopo and Drs. Tovell and Hall, has completed its first volume with four issues of nine hundred copies.

DEPARTMENT OF OPHTHALMOLOGY

Professor JOHN H. DUNNINGTON, Executive Officer

During the past year ophthalmology sustained a great loss in the death of our revered and wise counsellor, Professor Emeritus Arnold H. Knapp, for he maintained to the very end a keen and active interest in the affairs of this department. His advice on both clinical and experimental problems was sought widely and always given sagely. By establishing in 1940 the Herman Knapp Memorial Foundation under the auspices of Columbia University for research, teaching, and postgraduate study of ophthalmology, he showed not only his love for his specialty but also his devotion to this department.

During Professor Ludwig von Sallmann's absence on sabbatical leave, Professor George K. Smelser has directed the research activities of the

department. He has studied the development of the rabbit eye from the earliest differentiation of ocular structures to a near adult stage by means of histological sections and transparency preparations. He has continued his investigations on exophthalmos. Attention has been focused on the role the adrenal gland and its hormones play in the development of this condition.

Professor Zacharias Dische has continued his investigation of the changes in the proteins of the lens occurring with age and during cataract formation. With the assistance of Miss Ellen Borenfreund and Mrs. Ginevra Zelmenis he studied the formation of albuminoid in lenses of rats between 35 and 1,100 days of age.

Professor Seymour Halbert's investigations on the antibiotic activities of the ocular bacterial flora resulted in the isolation of a partially purified antibiotic from one strain of staphylococcus. The protective properties of this concentrate compared favorably with those of penicillin and of terramycin in the prophylaxis of his experimental infections in rats. In conjunction with Professor George K. Smelser, Dr. Deborah Locatcher-Khorazo, and Dr. Patricia Fitzgerald, he has continued his immunological studies on the lens. Professor Halbert is also continuing his studies on the purification of streptolysin "O" and the new streptococcal antigens he had previously isolated, and under his guidance Dr. Robert P. Burns is investigating the antibody response of humans in staphylococcal infections.

Dr. Gertrude Rand, Miss M. Catherine Rittler, and Dr. Charles Campbell, who have been working in the Knapp Memorial Laboratory of Physiological Optics, have completed their studies of the variable factors involved in flicker perimetry and a standard technique of administering this test has been adopted. Dr. Charles J. Campbell is continuing his experiments on change in the refractive state of the eye under low levels of luminance. Dr. Otto Lowenstein and Miss Irene Loewenfeld have continued their investigations on the variations in intraocular pressure and on ocular motility induced by stimulation of areas in the mid-brain.

Professor John H. Dunnington and Dr. Ellen F. Regan have enlarged the scope of their studies on ocular wound healing. With the assistance of Dr. Virginia Weimar they are investigating the alterations in the metachromacy of the ground substance and the rate of regeneration of the connective tissues in smooth and crushed ocular wounds. Further studies are being carried on the influence of local cortisone treatment on the healing of cataract incisions.

Professor Algernon B. Reese and Dr. Gabriele Ehrlich are pursuing their tissue culture studies on ocular tumors. Professor Reese has reported encouraging results on the treatment of retinoblastoma by radiation and triethylene melamine. Dr. Graham Clark has continued his electrosurgical studies on the treatment of detachment of the retina, and installed an electro-oculo-

graph which records the stimuli and responses of the extraocular muscles. Dr. Andrew de Roeth's experimental investigations on glaucoma have included a study of the metabolism of the ciliary body and of the effect exerted by central nervous system depressants, such as sodium pentothal, morphine, and demerol, upon the intraocular pressure. Dr. John M. Walcott has reported on the results of the experimental studies on the absorption of vitreous hemorrhage which he carried out under the guidance of Professor von Sallmann. Dr. David H. Rhodes is fractionating the stroma of the red blood cells to determine if possible the fraction responsible for the inflammatory response produced by the injection of hemolyzed blood into the vitreous of albino rabbits. Dr. Anthony Donn, in collaboration with Dr. Nicholas Christy of the Department of Medicine, demonstrated that the rise in plasma adrenocorticosteroids produced by the intravenous injection of typhoid vaccine could be blocked by the administration of amino pyrine. Dr. Donn, with the assistance of Dr. John McTigue, has also continued studies on the clinical usefulness of radioactive phosphorus in diagnosing intraocular tumors. Clinical studies on radiation cataract by Dr. George R. Merriam, Jr., lacrimal sac tumors by Dr. Ira S. Jones, a new scleral shortening operation by Dr. William G. Everett, and meibomian gland tumors by Dr. Bradley R. Straatsma have been presented. In addition to these reports, many addresses were given by the members of the department: Professor Reese delivered the presidential address on pathology before the American Academy of Ophthalmology and Otolaryngology, and the Snell Lecture at the Rochester Ophthalmological Society; Professor Raymond L. Pfeiffer gave the Curran Lecture at the University of Kansas; Dr. Charles A. Perera spoke to the Mexican Ophthalmological Society; and Drs. Merriam and Philip Knapp presented papers at the New York State Medical Society meeting. Positions of trust held during the past year included Professor Reese, president of the American Academy of Ophthalmology and Otolaryngology; Professor Gordon M. Bruce, member of the American Board of Ophthalmology and editor in chief of the *Transactions* of the American Ophthalmological Society; Professor Maynard C. Wheeler, chairman of the eye section of the New York Academy of Medicine, and secretary and treasurer of the American Ophthalmological Society; and Dr. Frank D. Carroll, chairman of the eye section of the New York State Medical Society. Professor Reese also served as moderator of a symposium on intraocular tumors at a meeting of the Pan-American Congress of Ophthalmology in Santiago, Chile, and was elected to honorary membership in the Chilean Ophthalmological Society. He also received the Howe Medal from the University of Buffalo in recognition of his contributions to ophthalmology. Of the twenty papers presented at the eastern section meeting of the association for Research in Ophthalmology on April 28, six were delivered by members of the department.

DEPARTMENT OF ORTHOPEDIC SURGERY

Professor ALAN DEFORD SMITH, Executive Officer

Research in the fields of chemistry, including histochemistry and tissue culture, has been continued in an effort to discover more of the basic facts about the fundamental structure and activity of bone, muscle, and connective tissue. In addition to these investigations in the laboratories, the members of the clinical staff of the department have conducted a number of other studies, the results of which have been presented in lectures and publications.

At the meeting of the American Orthopaedic Association in June, 1956, Professor Frank E. Stinchfield with Dr. Bernard Cooperman presented a comprehensive study of the results of prosthetic replacements of the femoral head in a large number of cases. On the same occasion Professor Halford Hallock, with Drs. Kenneth C. Francis and James B. Jones, read a paper on the growth effects following spine fusion in young children. This is the first significant report on this important subject.

Professor Harrison L. McLaughlin participated in panel discussions before many societies, took part in postgraduate courses, and read papers before several groups. Professor Frederick M. Smith, with Professor Ralph A. Deterling, Jr., of the Department of Surgery and Dr. Robert H. Vaughan, reported on a case of successful excision of an aortic aneurysm, explored as a paraspinal tumor. Dr. Charles S. Neer II was chairman of the twenty-first fracture day meeting of the American College of Surgeons and read papers before several other meetings during the year.

In conjunction with the fetal life study which is being made by the Department of Pediatrics, Dr. Charles T. Ryder has made a very important study of the incidence of congenital dislocation of the hip and of the occurrence of findings usually interpreted as indicative of the presence of this deformity. Dr. Ryder found that many of these signs are present in normal infants.

In a continuation of his study of painful low-back conditions, Professor Everett C. Bragg with Dr. Duke B. Baird has completed an analysis of the end results of herniations of the lumbar intervertebral discs treated by excision of the disc and spine fusion. Professor Melvin B. Watkins and Drs. Robert E. Samilson and Daniel M. Winters have made a very interesting study of the results of treatment of suppurative arthritis. They have attempted to evaluate the role of antibiotics as compared with surgical drainage in the management of this disease.

Dr. Robert E. Carroll has made studies, the results of which soon are to be published, of radiation osteogenic sarcoma in the thumb and osteogenic sarcoma of the hand. He also has described a technique for the use of a wire loop in arthrodesis of the shoulder.

Professor C. Zent Garber with Mr. Abdel Said has devised a micro method for determination of calcium and magnesium in biological material. Mr. Said has written a paper on the mathematical treatment of continuous and semi-continuous sampling titrations and has completed another paper on the theoretical plate concept in chromatography, which goes beyond previous uncertainties and approximations and should be applicable to other multi-stage processes.

Professor Gabriel Godman continued his studies of the desoxyribonucleo-protein complex during the cell cycle, and was able to demonstrate differences in this complex in proliferating and nondividing cells. Dr. David P. Bloch, who is associated with Professor Godman in this investigation, has suggested an explanation for a better understanding of the helical structure of the DNA strand. Dr. Bloch and Professor Godman have written chapters for a projected book on analytical cytology to be published as a memorial to the late Dr. Henry Bunting.

Other activities in the histochemistry laboratory include further study of neoplasms with reference to systems affecting DNA or protein synthesis; histochemical and cytochemical studies of various cell types in tissue culture; some effects of cortisone on cells of mesenchymal derivation in tissue culture; and studies on the nuclear constituents of some cultured cells.

The method devised by Dr. C. Andrew Bassett for the growth of connective tissue cells in mass has been utilized to produce quantities of ground substance sufficient for fractionation and chemical analysis. Professor Karl Meyer has conducted this investigation on the products of cell growth derived from various tissues including skin, endosteum, and hyaline cartilage. Quantitative studies on the relations between the production of intercellular materials by endosteal cells in vitro and various conditions affecting growth and metabolism are being undertaken. As a prerequisite to this, a method of evaluating cell mass has been developed by Dr. Henry Grossfeld and Mr. Charles Morris. Dr. Bassett also found a progressive change in the metabolic activity of tendon cells in tissue culture. A joint project has been established by Dr. Bassett and Dr. Christopher Nordin of the Department of Medicine to determine the relationship of bone viability to calcium-phosphorus equilibria.

Dr. Bassett and Professor James B. Campbell of the Department of Neurological Surgery have developed the use of a monomolecular filter (millipore) in animals to investigate homograft response.

Professor Stinchfield was appointed professor of orthopedic surgery, executive officer of the department, and director of the service of orthopedic surgery to succeed Professor Smith, who retired on June 30, 1956. Dr. Smith has been designated professor emeritus of orthopedic surgery and consultant to the Presbyterian Hospital.

DEPARTMENT OF OTOLARYNGOLOGY

Professor EDMUND P. FOWLER, JR., Executive Officer

The problem facing all universities, hospitals, and group clinics in trying to obtain qualified otolaryngologists highlights the importance of recruiting more men for this specialty. Aside from the groups mentioned above, who are concerned with complete medical care, few as yet seem to be aware of the shortage of skilled men in the field.

Students who have chosen otolaryngology for an elective in the third year are enthusiastic about the fresh clinical material available for clerkship work on the wards and in the outpatient department. Mr. John Rathe, a medical student, worked out a technique for studying small blood vessel circulation in the chorioallantoic membrane of the chick; for this work he was awarded the Coakley Memorial Prize.

The department is glad to announce that Dr. John J. Conley has been appointed professor of otolaryngology and chief of the head and neck division. This division with the cooperation of Dr. Robin M. Rankow of the Department of Dental and Oral Surgery, Dr. David M. C. Ju of the Department of Surgery, Professor Morton M. Kligerman of the Department of Radiology, and the residents in the Department of Surgery, has become an outstanding feature of the ear, nose, and throat service. Dr. John Pierce has been appointed an assistant in otolaryngology.

A major research project has been the study of stapes ankylosis and stapes mobilization. The experiments were largely done by Dr. Milos Basek under the direction of Professors Franz Altmann and Edmund P. Fowler, Jr. Professors Altmann and Fowler and Dr. Basek have been studying the newer techniques of improving the hearing in chronic ear disease by means of tympanoplasty, which has become increasingly popular in Germany and other European countries. We have been visited by Professor H. Wullstein of Wurzburg and Professor J. M. Tato of Buenos Aires, two of the foremost investigators of the new tympanoplasty procedure.

Dr. Basek has continued his studies of the course of the facial nerve because of the finding in clinical material of certain anomalous cases. Professor Altmann continued his researches on the changes of the temporal bone in anencephaly and osteogenesis imperfecta. He attended meetings in Europe where his film, "Embryology of the Ear," was shown in Siegen, Munich, Innesbruck, Vienna, Zagreb, and Istanbul. Professor Altmann received the special award of merit from the American Academy of Ophthalmology and Otolaryngology for his film on the embryology of the ear and shortly after this the Charles Bramman award in New York City.

Professor Daniel C. Baker, Jr., has continued his activities with the

American Medical Association committees on accreditation of hospitals with particular reference to departments of otolaryngology. He was also elected to the American Laryngological Society. With Professor Jane D. Zimmerman of Teachers College, he has continued his researches on the infantile larynx and newer methods of teaching esophageal voice.

Professor Conley continued his researches on closing of stomata and on arterial grafts and nerve grafts for the rehabilitation and repair of patients from whom large amounts of tissue had to be removed because of cancer. Professor Fowler gave the Wherry Memorial Lecture of the American Academy of Ophthalmology and Otolaryngology.

Dr. Vladimir Epanchin has worked out a satisfactory method of taking pictures with electronic flash and has completed in the last year a series of teaching movies on facial paralysis, the removal of temporal bones and stapes mobilization, the blocking of small blood vessels with white thrombi and with trauma. Professor Fowler read a paper on the psychological and constitutional types in otosclerosis and Ménière's disease at the meeting of the Collegium Otolaryngologicum in Zagreb and presented a new film on stapes mobilization entitled "Anterior Crurotomy" before the Turkish National Otolaryngological Society in Istanbul. Professor Jules Waltner published a paper on the effect of salicylates on the inner ear. He has also been working on the sources of otologic pain and on the pneumatization of the temporal bone and the role of hereditary factors. With the fetal life study group, Dr. Robert Hui and Dr. Morris Kalmon are developing methods for the testing of hearing in infants.

Professor De Graaf Woodman read a paper before the American Laryngological Society on the treatment of laryngeal papilloma and another on voice return before the American Academy of Ophthalmology and Otolaryngology.

The exhibit originally prepared for the twenty-fifth anniversary of the Medical Center, showing twenty-five years of progress in otolaryngology was shown at the American Academy of Ophthalmology and Otolaryngology and also at the New York State Society.

Dr. Claude Pennington of the resident staff made a study of cystic fibrosis of the pancreas with its relationship to sinus disease.

DEPARTMENT OF PATHOLOGY

Professor HARRY P. SMITH, Executive Officer

In the early decades of the present century, specialization in the practice of medicine was usually achieved by a different method than at present. Almost invariably, young physicians began as general practitioners. Gradually, through a process of self-instruction, many of them became specialists.

More recently, specialization has been achieved more and more through several years of intensive, supervised full-time training in specialized "residency" programs which follow a one-year "internship." This transition from the older system of training to the newer one has not yet run its full course in most of the clinical specialties. Indeed, a survey of data supplied by the American Medical Directory indicates that nearly one half of the clinical specialists now in practice were taught by the older method. In pathology, on the other hand, and in the one or two other specialties such as radiology and anesthesiology, the training, almost from the beginning, has been carried out under the residency system. Currently, about 80 percent of all pathologists of this country have been certified by the American Board of Pathology, and are listed in the Directory of Medical Specialists. An examination of their records indicates that almost all of this group, and a part of those not so listed, had extensive supervised residency training in their earlier years.

The modern reliance on residency training places a heavy burden of responsibility on hospitals, particularly on teaching hospitals, for providing such training in large volume and of high quality. Our own Department of Pathology is developing an informal type of affiliation with several hospitals, in order to provide wider opportunities for young men desirous of entering this field of specialization.

It is becoming evident that young men who do enter the field of pathology are enabled in most cases to fulfill their two-year military obligation to the Armed Forces through assignment to laboratory departments of military hospitals, most of which are well organized and well supervised. The department encourages this type of assignment at an early stage of specialization, since it both fulfills a need of the Armed Forces and at the same time provides the young man with valuable training and experience which he would not get in certain other types of assignment.

Young residents in training frequently demonstrate talent as teachers and investigators. These men are encouraged to remain in the academic environment, either here or elsewhere. In the past several years, several have accepted junior positions in other medical schools. This has been balanced by the recruitment of young men who had received a part or all of their residency training in other institutions. This free exchange between institutions brings new concepts to Columbia; it also helps to transplant the viewpoints of traditions of Columbia to academic centers elsewhere.

The research facilities of the department are shared freely with students and with young members of the staff. The older members provide inspiration and guidance, if needed. The ability to attract and maintain the interest of young men of genuine promise is one of the best measures of academic achievement. The research activities of various divisions of the department, as described below, should be viewed in this light.

In the division of general pathology, Professor Wellington B. Stewart, in collaboration with Dr. Daniel W. Benninghoff, has continued his earlier studies of the kinetics of iron absorption in normal animals and has extended the studies to iron-deficient animals. He and Professor Fred V. Lucas have undertaken studies of heme pigments, using radioactive iron as a method of procedure. The work of Professor Stewart on experimental fatty liver in animals has been conducted, with the collaboration of Dr. E. James Feeley, from the standpoint of curing the disorder once it has made its appearance. Professor Lucas, in collaboration with Dr. Donald Senhauser, has continued the studies he began at the University of Rochester. They have concerned themselves mainly with the oxidative enzyme system in proliferating tissue.

The division of neuropathology is closely integrated with the neuropathologic service at the New York State Psychiatric Institute. Professor Leon Roizin has been placed in charge of neuropathology at the Institute, with Professors Abner Wolf and David Cowen to consult, whenever indicated, in planning as well as in teaching and research. Professor Wolf has expanded his graduate training program in neuropathology with aid of traineeship funds from the United States Public Health Service.

Dr. Mavis Kaufman and Professors Wolf and Cowen have completed their study of acquired adult toxoplasmosis in man. The first two investigators also completed studies on the infection of Indian monkeys with *Trypanasoma cruzi*. Dr. Kaufman, along with Professors Wolf and Elvin Kabat, made studies on allergic encephalomyelitis in monkeys. Professors Cowen and Wolf published an extended study on cerebral atrophies and encephalomalacias in infancy and childhood. Professor Irwin Feigin is reporting on the occurrence of sarcomatous changes in glioblastomas.

It is with regret that we announce the resignation of Professor Feigin and Dr. Stanley Aronson, but it is a pleasure to report that Professor Feigin is to be head of the division of neuropathology in the Department of Pathology at the New York University School of Medicine, and that Dr. Aronson has accepted a position as director of the division of neuropathology in the Department of Pathology at the State University of New York College of Medicine, in New York City.

Professor C. Zent Garber and Mr. Abdel Said, of the division of orthopedic pathology, have devised a micro method for the determination of calcium and magnesium in biological material. Mr. Said has also prepared a paper on the mathematical treatment of continuous and semicontinuous sampling titrations, and a second one on the theoretical plate concept in chromatography.

Professor Theodore F. Zucker and Dr. Lois M. Zucker, of the division of chemical pathology, have continued the studies which were reported last year on the effect of selective breeding on organ size of rats. These experiments show that "correlated characters," long known to the geneticist, are

not confined to casual characteristics of an anatomical nature; inheritance of correlated characters also extends to basic differences in physiological and nutritional states, and to susceptibility to certain types of disease. They have also conducted a series of studies on the content of acetylcholine of the intestinal tract of animals maintained on a diet deficient in pantothenic acid.

Professor Henry S. Simms and Dr. Charles R. Harmison reported last year that the lipofanogens responsible for the deposition of fat in certain cells of tissue cultures are not to be identified with the lipoproteins described by Professor Frank T. Lindgren of the University of California. Dr. Benjamin N. Berg, working jointly with Professor Simms on a colony of aging rats, has conducted studies on the relationship of body weight to skeletal size, as related to age of the animal.

Dr. Hans Kaunitz, in his nutritional studies on rats, has found that fats are better utilized under conditions of restricted food intake than is carbohydrate. Drs. Waldo Ault and Daniel Swern of the Eastern Regional Research Laboratory of the United States Department of Agriculture and Dr. Charles A. Slanetz, curator of animal husbandry, collaborated in this research. Dr. Kaunitz confirmed the fact that diets low in potassium produce renal lesions in rats, despite administration of sodium chloride.

The division of pediatric pathology has collaborated actively and effectively with the Department of Pediatrics in teaching and research, and in laboratory service to the Babies Hospital. Professor Dorothy H. Andersen was on sabbatical leave during the last half of the academic year, and was engaged in scientific studies abroad. Dr. William A. Blanc assumed responsibility for many of Professor Andersen's duties during her absence. Members of the division have continued their research in fibrocystic disease and in glycogen disease of the liver, and have published their findings in both fields. Their activities, in collaboration with others, extend into studies on kernicterus, problems of malformation, and problems of sterility. Professor Andersen and Dr. Janice Kelly have completed two papers on congenital endocardial fibro-elastosis and endocardial fibro-elastosis associated with congenital malformations of the heart. A comparative study of these two groups throws certain light on the disease mechanisms involved.

Professor Edith Sproul, stationed at the Francis Delafield Hospital, was on sabbatical leave during the last few months of the academic year, and has served during that period as acting head of the Department of Pathology at the American University of Beirut in Lebanon. She completed a review on the biochemical and structural characteristic of particular components of cells, both normal and malignant. These studies prepare a foundation for an extension of the work already carried out at the Delafield Hospital along these lines.

Dr. Silvio Fiala and Mrs. Anna Fiala have collaborated with Professor Sproul on a study of the trophic hormones of the pituitary and on the effects which they produce in other endocrine glands.

DEPARTMENT OF PEDIATRICS

Professor RUSTIN McINTOSH, Executive Officer

With the closing of Willard Parker Hospital, the municipal contagious disease facility of the Borough of Manhattan, a new program has had to be devised for teaching the clinical aspects of the common communicable diseases to undergraduate medical students. Through the kindness of Dr. L. Emmett Holt, Jr., of the New York University College of Medicine and of his staff, the wards of the new contagious-disease service at Bellevue Hospital have been made available to our students, so that the appropriate courses of instruction have gone forward without interruption.

Inadequacy of research facilities, especially of laboratory working space, continues to hamper the work of the pediatric department and to restrict sharply its investigative productivity.

New appointments include those of Gilbert W. Mellin as instructor, and of Walter M. Chemris, Carolyn R. Denning, Sylvia P. Griffiths, James R. Guthrie, Leonard S. James, and Leo F. J. Wilking, Jr., as assistants. Dr. James is assigned for clinical work to the department of anesthesiology.

Members of the department have spoken before scientific audiences in various parts of the country.

Professor Hattie E. Alexander discussed various aspects of bacterial transformation in seminars held at the University of Colorado at Denver, in the California Institute of Technology at Pasadena, and at the McCollum-Pratt Institute of the Johns Hopkins University. She also participated in an international symposium on tuberculosis in infancy and childhood, held in Denver. Professor Dorothy H. Andersen, assigned to pediatrics from the department of pathology, gave the Brennemann Lecture before the pediatric section of the Los Angeles County Medical Association. Professors Andersen, McIntosh, and Paul A. di Sant'Agnese took part in a pediatric research conference at the University of Iowa. Dr. Melvin M. Grumbach spoke at the annual meetings of the Endocrine Society and of the American Academy of Pediatrics. Professor McIntosh visited the University of Puerto Rico as acting chief of the pediatric service and spoke before the Pediatric Society of Puerto Rico; he also delivered the Bela Schick lecture at Mount Sinai Hospital.

Among the honors conferred on members of the department, particular mention must be made of the Elizabeth Blackwell award, given to Professor Alexander. She also served as chairman of the Council of the American Pediatric Society.

Numerous visitors came to the department from various parts of the world during the year. Special thanks are due to Dr. Geoffrey S. Dawes,

director of the Nuffield Institute of Medical Research at Oxford, for his kindness in addressing the pediatric staff.

Professor Alexander is studying, in collaboration with Drs. Katherine Sprunt and Isabel Morgan Mountain, the genetic determination of poliomyelitis viruses. Investigations in the field of bacterial genetics, in which Miss Grace Leidy and Professor Zamenhof participate, continue to throw light on the nature and mode of action of the determinants of heredity. Professor Douglas S. Damrosch and Dr. Saul Blatman have collaborated with Professor Alexander in studies of treatment of tuberculous infection in infancy and childhood, as part of a nationwide collaborative project.

Professor Andersen, Dr. William A. Blanc, Dr. Douglas N. Crozier, and Professor William A. Silverman have collaborated in evaluating the effect of two different anti-bacterial regimens on the morbidity, incidence of nuclear jaundice, and the mortality of premature infants. A somewhat comparable project is now going forward in the hands of the same team of investigators, which is designed to explore the relative values of high or moderate humidity in the ambient atmosphere to which premature infants are exposed in the first days of life. Dr. William A. Bauman has been studying correlations among clinical, roentgenographic, and pathological findings of premature infants in the neonatal period.

Studies of the celiac syndrome have been especially fruitful in the past year. Professor di Sant'Agnese, in collaboration with Professor Zacharias Dische, of the Department of Biochemistry, has demonstrated the presence, in patients with cystic fibrosis of the pancreas, of a peculiar mucopolysaccharide in the duodenal contents. Professor di Sant'Agnese and Dr. Blanc have made an important study of the hepatic lesions of pancreatic fibrosis. With the help of Professor Heinrich B. Waelsch of the Department of Biochemistry, a promising diagnostic test is being explored which may possibly permit an earlier and more accurate identification of cases of true celiac disease. In collaboration with Professor Alfred P. Fishman and Dr. John A. Wood of the Department of Medicine, as well as with Professor Robert C. Darling of the Department of Physical Medicine and Rehabilitation, Professor di Sant'Agnese has made further explorations of disturbances of cardio-respiratory physiology in patients with pancreatic fibrosis, and of the electrolyte content of the secretions of relatives of patients.

Dr. Melvin M. Grumbach, in collaboration with Professor Earl T. Engle of the Department of Obstetrics and Gynecology and with Dr. Blanc, has studied the sex chromatin pattern of a number of patients afflicted with various disorders of the organs of reproduction. With Professor Sidney C. Werner of the Department of Medicine, Dr. Grumbach has participated in a study of the placental transfer of thyroid hormones. A survey has been undertaken by Dr. Grumbach of the urinary excretion of steroid metabolites in relation to age and adrenocortical function, a project toward which

Professor Seymour Lieberman, of the Department of Obstetrics and Gynecology, has generously shared both advice and laboratory space.

Professor Ruth C. Harris has continued her studies of the excretion of amino acids in patients with a variety of metabolic problems. Studies of liver function in premature infants, as measured by the concentration of bilirubin in the serum as well as by other liver function tests, have gone forward.

In the long-term study of the pathogenesis of developmental malformations, which has been actively pursued for the past ten years, immediate administrative responsibility has been transferred from Dr. Rose G. Ames to Dr. Gilbert Mellin. An analysis of the role of herpes simplex in its effect on the growing fetus is under way. Roentgenographic study of the pelvic bones and of the hip joints and their deviations are being studied in collaboration with Professor John Caffey of the Department of Radiology. The clinical aspects of these studies were shared by Professor Silverman and Dr. Ames of this department, and by Dr. Garry de N. Hough, Jr., and Dr. Charles T. Ryder of the Department of Orthopedic Surgery. An interesting by-product of these studies has been the recognition of a reliable diagnostic sign of mongolian idiocy, a roentgenographic feature which is particularly helpful during the first six months of life when the clinical diagnosis of this condition is often attended with considerable difficulty.

Professor Sidney Blumenthal and Dr. Sylvia P. Griffiths have undertaken a reorganization of diagnostic studies in congenital heart disease in young patients. Their program of evaluation, carried out in collaboration with members of the Departments of Surgery and Medicine, has greatly improved the accuracy of pre-operative diagnosis.

Twenty-five articles were published from the department.

DEPARTMENT OF PHARMACOLOGY

Professor HARRY B. VAN DYKE, Executive Officer

Important changes in the staff of the Department of Pharmacology occurred during the academic year. Professor Alfred Gilman resigned in order to join the Albert Einstein College of Medicine as professor and executive officer of the Department of Pharmacology. Professor Shih-Chun Wang, at present a member of the Department of Physiology, has been appointed professor of pharmacology and will take up his new duties on July 1, 1956. Dr. Sheldon B. Gertner was appointed an associate in pharmacology.

The principal course in pharmacology is offered to medical and dental students in the latter part of the second year. Important aid in the teaching program of lectures or demonstrations was given by Professors Virginia Apgar, M. Jack Frumin, and Emanuel M. Papper of the Department of

Anesthesiology, by Professors Alfred Gellhorn and John V. Taggart of the Department of Medicine, by Professor Sidney Carter of the Department of Neurology, by Dr. Martin Winbury of the research laboratories of the Schering Corporation and by Dr. Murray E. Jarvik of the Department of Pharmacology of the Albert Einstein College of Medicine. The Departments of Medicine and Pharmacology cooperate in offering third- and fourth-year medical students a course in applied pharmacology and therapeutics. This year the departmental representatives for this course were Professor Hamilton Southworth of the Department of Medicine and Dr. Frederick G. Hofmann of this department.

The training of graduate students to help meet the great need for trained pharmacologists is an important function of this department. Three students received graduate training during the year.

Professor Herbert J. Bartelstone is at present interested in fibrocystic disease of the pancreas and other organs, and participated in a research conference on this topic at the University of Iowa. He is investigating the role of the autonomic nervous system in cystic fibrosis. His research on the use of radioactive isotopes in studying the transfer of anions through the enamel and dentine of teeth was the subject of a lecture given before the American Academy of Periodontology at the University of Michigan. Professor Bartelstone also participated in postgraduate courses for dental students and in special seminars in periodontology.

Dr. Hofmann, now a Markle Scholar in medical science, is continuing his investigation of the biogenesis of adrenal cortical steroids. The comparative biochemistry of rodent adrenals *in vitro* is also under study.

Dr. Paul Brazeau has a special interest in partially isolated renal functions in a mammal such as the dog. The physiology of the kidneys in a given animal is compared when alterations of ionic environment or other disturbances, such as the injection of hormones or drugs, are limited to one kidney. In association with Dr. Alan R. Koch and Professor Gilman, Dr. Brazeau completed a study of the mechanisms of potassium excretion by the kidney.

Dr. Karlis Adamsons, Jr., and Mr. Stanford L. Engel worked in close association with Professor Harry B. van Dyke in studies of the distribution, stability, and pharmacology of the hormones of the neurohypophysis. Pharmacological methods of differentiating arginine from lysine vasopressin were discovered so that the probable type of vasopressin secreted by a mammal could receive preliminary identification prior to the laborious and difficult chemical characterization which will ultimately be required.

Dr. Adamsons has carried out numerous experiments on the stability of natural and synthetic oxytocin and vasopressin by varying the temperature and hydrogen-ion concentration of solutions of the hormones. Mr. Engel has investigated the distribution and quantities of the hormones in the hypothalamus and posterior lobe of several mammals including man. Many

aspects of the work on the neurohypophysis have been carried out in close cooperation with Professor Vincent du Vigneaud and his colleagues of Cornell University Medical College.

Dr. Gertner has performed preliminary experiments designed to reveal factors which affect the release of acetylcholine from synapses in the superior cervical ganglion. Miss Sarah Henry has investigated the components of the interstitial-cell stimulating hormone of the anterior pituitary. New methods of immunology have been employed for the first time in the investigation of a protein hormone.

Professor van Dyke attended the symposium on the neurohypophysis sponsored at the University of Bristol by the Colston Research Society. While in Great Britain he gave lectures at the universities of Glasgow and Edinburgh.

Rather extensive alterations of the department's sharply restricted space are in process. New rooms are being added on each side of the student laboratory where a better-planned area for demonstration experiments is being constructed. New and special provisions for aseptic operations, histological work, and photography are being added. Dr. Brazeau made a major contribution to the planning of the alterations.

DEPARTMENT OF PHYSICAL MEDICINE AND REHABILITATION

Professor ROBERT C. DARLING, Executive Officer

The department is fortunate in having clinical facilities in which students are exposed to almost all phases of rehabilitation. The Presbyterian Hospital covers the acute phase and some of the subacute phases. The Institute for the Crippled and Disabled is concerned chiefly with the later phases. One need for this interim is the availability of at least a small number of inpatient rehabilitation beds. Another need is the availability of dormitory space during the later phases of rehabilitation.

Teaching at the residency level continues as a top responsibility. The small group of enthusiastic and able trainees in this category could well be enlarged within the existing opportunities for experience. The clinical material at the Institute for the Crippled and Disabled, as well as a larger proportion of that at Presbyterian Hospital, is now becoming better organized for teaching.

Undergraduate teaching continues in selected exercises in first-year correlation clinics, in physical diagnosis, and in the course in public health. Plans are being made to develop more fully the rehabilitation aspects of other clinical courses. An elective fourth-year clerkship in the field is offered, for which students may obtain student fellowships through the generosity of the National Foundation for Infantile Paralysis.

The postgraduate course in cerebral palsy was offered twice this year to a total of twenty-six therapists and two physicians. A notable feature of this course continues to be the high professional qualifications of the students who come from widespread areas of the United States and abroad. Selected lectures in this course by national leaders in the field are open to a wider audience invited from clinical centers in the city. A special lecture sponsored by United Cerebral Palsy Associations of New York State was timed to be given during the fall course; Dr. George W. Corner, Jr., of the Department of Obstetrics and Gynecology, Johns Hopkins Medical School, spoke before an audience of workers in the many fields of medicine related to cerebral palsy.

Miss Helen Spencer, instructor in physical therapy, compiled and published *A Glossary of Scientific Terms in the Field of Cerebral Palsy*, originally a teaching aid for this course. Mrs. Isabel Robinault, instructor in occupational therapy, who was associated with Miss Spencer in the supervision of the courses, has consented to assume the responsibility for them during the coming year.

The Institute for the Crippled and Disabled has made several notable contributions to special teaching exercises in addition to its valuable aid in teaching physicians, physical therapists, and occupational therapists mentioned elsewhere in this report. The third June workshop, given jointly by the Institute, Teachers College, and the College of Physicians and Surgeons, again attracted experienced workers in various aspects of rehabilitation to function as actual working teams during the period of the course. A fifth all-day conference on problems of compensation medicine attracted an audience of nearly three hundred to discuss the theme "Motivation in Rehabilitation." The American Academy of Compensation Medicine joined the Institute in sponsoring this year's conference.

Professor Edward E. Gordon completed his study on the energy cost of crutch-walking in paraplegics. Professor Gordon resigned during the year to assume directorship of physical medicine and rehabilitation at Michael Reese Hospital in Chicago.

Dr. Shyh-Jong Yue continues with Professor Darling to study the effect of various forms of rest in facilitating recovery from physical fatigue. Dr. Yue was the winner of a prize essay contest conducted by the American Congress of Physical Medicine and Rehabilitation which has been published in the Archives of Physical Medicine and Rehabilitation.

Professor Darling became chairman of a clinical advisory committee to the convalescent care study being conducted by the School of Public Health and Administrative Medicine. He was appointed an associate editor of the *American Journal of Physical Medicine* and a member of the Board of Directors of the New York Tuberculosis and Health Association.

Professor William Benham Snow has built up the educational aspects of the hospital service in physical medicine, particularly by a regular series of

intensified teaching exercises for therapists and physicians, and by regular teaching rounds. He continues his many consultative duties in community services, particularly for the cerebral palsied. He was awarded a special certificate of merit by the New York Society of Physical Medicine and Rehabilitation.

Professor A. David Gurewitsch was appointed director of medical services at the Institute for the Crippled and Disabled and promoted to associate clinical professor. He attended the World Federation of United Nations Associations in Bangkok in September as a delegate, and in the course of his travels lectured before rehabilitation and poliomyelitis workers in Bangkok, Bali, and Caracas.

Professor Morton Hoberman became a member of the Orthopedic Advisory Committee, Bureau of Handicapped Children, of the New York City Department of Health. In his work at the New York State Rehabilitation Hospital, he concluded and published the results of a study of rehabilitation in muscular dystrophy, and embarked on an evaluation of rehabilitation potentials among disabled recipients of welfare in New York State.

Dr. Milos J. Lota continued his clinical exploration of uses of ultrasound. He assumed a position for the major portion of his time at the Manhattan Veterans Hospital, but will continue as instructor in physics and electrotherapy for students in physical therapy.

OCCUPATIONAL THERAPY

Sixty-nine students were registered for the academic year, of which thirty-nine were in the academic program and thirty were receiving clinical experience in affiliated institutions. Twelve students completed requirements for the Bachelor of Science degree and sixteen for the certificate. Expansion of scholarship support combined with more active recruitment is a pressing need in view of the reduction in applications and the steadily mounting cost of education. The national need for graduate occupational therapists continues to be great.

This year, forty-three students received clinical instruction in twenty-nine hospitals or agencies. The following were added to the list of training centers: Delaware Curative Workshop, Wilmington; Homer Folks Hospital, Oneonta, New York; and the Veterans Administration Hospital, Hines, Illinois. One student entered the Army and received her clinical instruction at the Valley Forge Army Hospital. Although not used regularly, assignments were made to the following facilities when special scheduling was necessary: Home for the Aged and Infirm Hebrews, New York City; New Jersey State Hospital, Trenton; Workmen's Compensation Board Convalescent Center, Malton, Canada.

A grant for this year was received from the Office of Vocational Rehabilitation to improve the quality of instruction and to prepare instructional aids for use in the occupational therapy curriculum. To implement these

goals, Miss Marguerite Abbott and Miss Thelma Wellerson have collaborated in the lecture and laboratory sections of the course in occupational therapy for physical disabilities, and have accepted responsibility for writing two manuals.

Mrs. Helen Rothwell has been a fellow in a two-year program since January, 1955. The aim of the fellowship is to train future teachers of occupational therapy. Miss Abbott has been awarded a similar fellowship for a one-year period of study.

The resignation of Miss Edith Brokaw, associate in occupational therapy, was accepted with regret. Miss Dorothy Ericson joined the staff as assistant in occupational therapy and has been aiding Miss Brokaw in laboratory instruction in skills.

The Student Council met regularly and carried on as an important liaison between classes and the administrative office. The students were active in the professional activities of the New York Occupational Therapy Association.

PHYSICAL THERAPY

Again this year emphasis was placed on integration and correlation of basic science courses with the several phases of physical therapy. Also, combined basic science courses were conducted, when feasible, for both occupational and physical therapy students. Those classes which involved laboratory sessions in addition to didactic work were given at the College of Physicians and Surgeons. The considerable time and expense consumed by staff and students in traveling to the Institute for the Crippled and Disabled to make use of the excellent opportunities there continues to be a handicap to the program.

A total of fifty-five students were enrolled in courses this year from forty-six different colleges and universities, from a wide area in the United States, and from foreign countries. Nineteen advanced standing students were awarded certificates in October and two in February; thirteen seniors were awarded the Bachelor of Science degree this June; seven students withdrew for various reasons.

The certificate program continues to be in great demand: this year the applications for that course were more than twice those for the degree program. Applicants offer a wider assortment of educational backgrounds than was previously experienced. This year's class had only eight students with a background in physical education; seven came with a background in a field of science, such as biochemistry; three in nursing education; two in general education; one in political science and one in home economics. Registered nurses are now required to present the same college science prerequisites as other applicants for the certificate program.

Miss Dorothy Strumfeld was accepted for one year of study under a fellowship program established by the National Foundation for Infantile

Paralysis for the purpose of preparing instructors for schools of physical therapy.

This year brought the total number of graduates of the course to 353, and there is an interest in having an active alumni organization.

The Second Congress of the World Confederation for Physical Therapy met in New York City in June. The graduates and staff of our course were active in arranging the professional and social program, including organized visits to the Medical Center.

DEPARTMENT OF PHYSIOLOGY

Professor WALTER S. ROOT, Acting Executive Officer

Several changes have taken place in the personnel of the department. Professor John L. Nickerson has resigned to accept an appointment as professor and chairman of the Department of Physiology and Pharmacology of the Chicago Medical School, and Professor Shih-Chun Wang has resigned to become professor of pharmacology in this institution. Professors Louis Cizek and William Nastuk have been advanced from the position of assistant to associate professor. Dr. Mero Nocenti of Rutgers University will join the department as an instructor and Dr. Shu Chien, a teaching assistant, will become an instructor. Professor Magnus I. Gregersen is spending his sabbatical leave visiting various laboratories and institutes in Europe.

During the year members of the department have given several lectures. Professor Thomas Allen spoke on blood volume and adiposity to the division of biology of the Argonne National Laboratory in Chicago, and gave the Merck Lecture at Queens University Medical School, Kingston, Ontario. Professor Shih-Chun Wang lectured on the mechanism of emesis at the research laboratory of Eli Lilly Company, Indianapolis, and on motion sickness at the School of Aviation Medicine, Randolph Field, Texas. Professor Walter S. Root was a member of the faculty of the graduate instructional course in allergy held by the American College of Allergists. Professor William Nastuk took part in a symposium on the electrical activity of the heart at the New York Academy of Sciences and appeared on the twentieth-anniversary program of the Bureau of Biological Research at Rutgers University.

Professors Nicholas di Salvo, Louis Cizek and William Nastuk were elected fellows of the New York Academy of Sciences. Professor di Salvo also became a member of the editorial board of the *New York State Dental Journal*. Professor Wang became treasurer and Professor Nastuk was elected to the Board of Directors of the New York State Society for Medical Research. Professor Root served as president of the New York Academy of Sciences. The Order of the Brilliant Star was conferred upon Professor Gregersen by the Nationalist Government of Free China.

Professor Gregersen and Dr. Charles Pallavicini have continued to study the chemistry of brain tissue in dogs and monkeys subjected to X-irradiation. Dr. Ruth Rawson and Mr. David McIntyre are studying the use of radioactive chromium for the determination of blood volume. Dr. Shu Chien is investigating the effect of the rate of bleeding upon the circulatory responses of splenectomized dogs. With Dr. Adrian Lambert of the Department of Surgery, Professor Gregersen is attempting by various means to resuscitate the heart and brain.

Professor Wang has continued his investigations on motion and radiation sickness. In collaboration with Dr. Alfred A. Rinzi of the School of Aviation Medicine, Randolph Field, Texas, he has successfully eliminated vomiting in dogs following total body lethal radiation by either ablation of the trigger zone in the medulla or by abdominal visceral deafferentation. With Mr. Bert Horwitz, a second-year medical student, Professor Wang has shown that reserpine depresses the vasomotor center of the cat, and with Mr. Robert Grossman, a third-year medical student, he has found that sustained bladder responses obtained by electrical stimulation of the hypothalamus are due to the stimulation of fibers of which the cells of origin are located in the septum pellucidum and medial pre-optic area. Mr. Edgar Haber and Mr. Kurt Kohn, fourth-year medical students, have completed their work on the spontaneous respiratory neuronal activity for which they have received the Borden award for 1956. Mrs. Evelyn Sass is working on the reflex pathway involved in the cough mechanism, and Mr. Morten Cohen is studying the pneumotoxic mechanism in the rostral part of the pons.

Professor Nickerson has continued his studies on the basic properties of the ballistocardiograph. He has collaborated with Dr. Leon Moses of the Department of Psychiatry in studying the relation of cardiac output to hypertension in psychiatric patients, and with Professor Ralph A. Deterling, Jr., of the Department of Surgery in determining the cardiac output in patients after surgical repair of coarctation of the aorta.

Work on the relationship of human blood volume, skin folds, and vital capacity to the size of the body, less its adiposity, which Professor Allen carried out in Taiwan appeared in the May, 1956, number of *Metabolism*. Professors Allen and Root have completed a series of studies in which alveolar and blood levels of carbon monoxide have been compared.

For several years Professor Nastuk has investigated the factors concerned with neuromuscular transmission. With Dr. Otto J. Plescia of the Institute of Microbiology, Rutgers University, and Dr. Kermit Osserman of Mt. Sinai Hospital, he has shown that reduction in serum complement concentration is related to exacerbation of the symptoms in patients suffering from myasthenia gravis. Miss Barbara Olson has studied the anti-curare action of tensilon.

Professor Walcott supervised the course in medical physiology. He has

continued his interest in the development of a simple device for the determination of body volume in small laboratory animals.

Professor di Salvo and Dr. Hans H. Neumann of the Department of Dental and Oral Surgery are studying the relation of diet to dental caries. During the past summer they made a trip through Central and South America where they examined the teeth and dietary habits of the Indian population.

Professor Cizek's work on water balance has been extended to study the effect of water and electrolyte content of food on the fluid intake of animals.

Dr. Larissa Skvorcov-Lukin is engaged in determining the effect of X-irradiation on the vasomotor system of dogs exposed to 1,000r total body radiation.

DEPARTMENT OF PSYCHIATRY

Professor LAWRENCE C. KOLB, Executive Officer

Numerous changes were made in the academic program during this past year. Instruction of the medical students was modified within the confines of the present curricular hours throughout the total four-year course. The series of first-year lectures were arranged to provide a demonstration of the development of normal human behavior from infancy through childhood, adolescence, and maturity, and to indicate the influences of genetic, familial, and social factors modifying this behavior. The lectures were enlivened by the introduction of patients to illustrate certain points and by the utilization of short discussion periods at the end of each period. The second-year instruction focused upon psychopathology. Aside from the introduction of discussion groups during the third year, the extensive clinical experience was not materially modified other than having the students attend the weekly clinical demonstrations at the New York State Psychiatric Institute, where patient problems are presented from the various services of the Institute and the Presbyterian Hospital. During the fourth year, for the first time psychiatric consultants were available for regular discussion periods in the Group Clinic. The fourth-year lecture series was modified to focus upon a series of problems significant in the practice of medicine. The topics offered for discussion were alcoholism and drug addiction, emotional problems encountered in relation to illegal and therapeutic abortion, sterilization, pregnancy, adoption, and the relationship of psychoanalysis to medical practice.

Three medical students participated in the elective program during this year. These students attended all conferences, lectures, and supervisory sessions provided for the resident staff.

At the graduate level a three-year psychiatric residency training program

was established as a collaborative venture between the New York State Psychiatric Institute and the Presbyterian Hospital. For the first time residency positions in psychiatry were established by the latter institution. The resident staff is provided the opportunity of attending the various postgraduate courses and seminars and may enter psychoanalytic training in the latter year of residency if accepted by the Psychoanalytic Clinic. In this continuing contact with the other specialties it is believed that each resident will obtain an unusual experience in preparation for his future career in psychiatry.

The postgraduate course in neurology and psychiatry, held from October through December, 1955, was attended by a total of thirty-seven physicians. Twenty of this number were on the staffs of the various New York State hospitals of the Department of Mental Hygiene. The new plan of instruction includes a better arrangement of neuroanatomy, neurophysiology, neuropathology, and clinical neurological courses. Cooperation of the respective departments made it possible to present a progressive series of lectures covering simultaneously the functioning of various portions of the central nervous system.

During the past year a series of conferences were held with Dr. William Terhune and other members of the Committee on Certification of Mental Hospital Administrators of the American Psychiatric Association. As a result of these conferences, a course in psychiatric administration will be given during the academic year 1956 and will be conducted under the auspices of the School of Public Health and Administrative Medicine and the Department of Psychiatry. Professor Viola Bernard has devoted much of the past six months to study and conferences with the executive officers of the several departments and with Drs. Margaret W. Barnard and Mottram P. Torre, both of the School of Public Health and Administrative Medicine, as a means of assisting in the evolution of the curriculum for this new course and also for supervision of special instruction and experience for psychiatric residents in community and social responsibility in psychiatry. Also, Professor Bernard, with Dr. Robert A. Senescu and Miss Barbara Kohlsaat of the Social Service Department of Presbyterian Hospital, planned and initiated a joint seminar between the Presbyterian Hospital case work department on medical inpatients referred by the Department of Medicine to the Social Service Department.

The instruction by the Department of Psychiatry has profited this year by the opening of a suite of offices on the east medical wing of the eighth floor of Presbyterian Hospital. In addition, the service for acutely disturbed psychiatric patients has been reopened in the New York State Psychiatric Institute. The reopening of this service will make it possible to retain within the Medical Center all those patients who suffer serious behavior disturbances, whether in the course of psychiatric or medical ailments, and who must now be transferred elsewhere for continued treatment.

We are proud to report that Professor Hoch was appointed Commissioner of Mental Hygiene of the State of New York, on July 7, 1955. He is presently on a leave of absence from his duties with the department. Drs. Harry Pennes, research associate, Margaret S. Mahler, associate, and Professor I. Herbert Scheinberg resigned during the year to accept positions elsewhere.

As a means of developing a division of psychology within the Department of Psychiatry, Professor Carney Landis of the Department of Psychology of Columbia University, who has served for so many years as principal research scientist in psychology at the New York State Psychiatric Institute, has been transferred to the Department of Psychiatry. Also, Professor Joseph Zubin, who has served as adjunct professor of psychology in the School of General Studies, has been promoted to the rank of professor of psychology in the Department of Psychiatry.

At the New York State Psychiatric Institute, Professor Nicholas Kopeloff and Dr. Lenore M. Kopeloff have continued their studies of experimental epilepsy in the monkey by the alumina cream technique. An evaluation of unilateral and bilateral carotid arterial ligation in the monkey has been completed. The effect on seizures of occlusion of major cerebral arterial vessels is still under investigation. In collaboration with Professor William F. Caveness, an investigation is in progress on the production of epilepsy in immature monkeys at various age levels with emphasis on maturation of seizure patterns from early infancy. Dr. Joseph G. Chusid of St. Vincent's Hospital has collaborated in the above projects.

Professor Warren M. Sperry has continued his studies on the substances, other than cholesterol, which comprise about one third of the unsaponifiable fraction of brain lipides. Dr. Herbert L. Meltzer of the Department of Biochemistry has continued his efforts to separate brain lipides by counter-current fractionation. Dr. Benjamin Weiss of the Department of Biochemistry has developed a method for the chromatographic fractionation of sphingolipides on silicic acid columns.

The research work and teaching program of Professor Franz J. Kallmann and his associates remained focused on the genetic and demographic aspects of normal and disordered patterns of human behavior. Departmental studies which were completed during the academic year included the following: a twin family study of aging, longevity, and senile disorders, with Drs. B. Aschner, Arthur Falek and Michael Klaber; a twin sibship study of pre-adolescent schizophrenia, with Bernard Roth; a twin sibship study of mongolism and other specific types of mental defect, with Drs. George S. Baroff and Lucille Ross, and with Dr. Gordon Allen of the Research Branch, National Institute of Mental Health; a longitudinal twin study of declining intellectual performance in senescence, with Dr. L. Feingold Jarvik; a twin family study of quantitative variations in the production of a salivary receptor-destroying enzyme, with Professor Claus W. Jungeblut of the Department of Microbiology; a twin study of undifferentiated forms of mental

deficiency; a family study of the distribution of handedness; and carrier-detection studies in the families of Huntington's chorea and Friedreich's ataxia patients, with Donald B. Douglas and Drs. Walter F. Haberlandt and Egill Jensen. Newly organized research projects included a study of the adjustive and reproductive patterns of adolescent and adult New York State residents with early total deafness, with Drs. Edwards W. Deming, Edna S. Levine, and John D. Rainer; and a study of discriminative parental attitudes in twin families, with Mr. Roth and Diane Sank. In addition, Professor Kallmann headed the American committee which assisted in organizing the First International Congress of Human Genetics in Copenhagen, August 1-6, 1956.

Professor Heinrich Waelsch, in collaboration with Dr. Abel L. Lajtha and Dr. Sidney Furst, has continued the study of the blood-brain barrier and of protein metabolism in nervous tissue. In collaboration with Howard Sachs, research associate in biochemistry, the mechanism of amino acid incorporation into proteins and of protein synthesis was studied in particulate cell fractions. The enzymatic mechanisms of histidine synthesis and degradation were studied with Messrs. A. Miller and A. Neidle. Professor Waelsch acted as chairman of the organizing committee of the Second International Neurochemical Symposium and was appointed editor of the *Journal of Neurochemistry*.

Professor Harold J. Strecker and Dr. M. Berger have continued the studies of carbohydrate metabolism and oxidative phosphorylation in nervous tissue and have investigated the action of tranquilizing drugs on these processes.

Professor Leon Roizin is pursuing comparative histologic and electron microscope studies of the various morphologic constituents of the central nervous system. The results of some preliminary investigations were published in collaboration with Professor Leon Dmochowski of Baylor University. In collaboration with Professor Irville H. MacKinnon and Dr. Reginald Taylor, an investigation has been continued on the chronic effects of isonicotinic acid hydrazide upon the central nervous system in monkeys. In view of the fact that jaundice and Parkinsonism were observed in some mental patients under thorazine treatment, Professor Roizin is collaborating with Dr. Mary Knight and Dr. Taylor on a study of the chronic effects of this drug in macacus rhesus monkeys. Upon invitation, Professor Roizin has reported some comparative histologic and histochemical studies of the intraneuronal inclusions in myoclonus epilepsy and neuroglial changes in metabolic disorders of the central nervous system.

Professor Landis and his associates continued their investigation of the changes in flicker fusion, auditory threshold, and reaction time, which are brought about by various forms of shock therapy administered to psychiatric patients. Professor Zubin continued his investigations in the development of prognostic indicators which may be applied to schizophrenia patients on

their first admission to mental hospitals. He continued the teaching of the courses in advanced abnormal psychology and in experimental abnormal psychology to graduate students in Columbia University.

In collaboration with Professors J. Lawrence Pool and Joseph Ransohoff of the Department of Neurological Surgery, Drs. Sidney Malitz and Murray Glusman, Professor James Cattell, and Dr. Harry Pennes have continued their investigations into the effects of various psychosurgical procedures in severe mental disorders. Dr. Malitz and his group have also been studying the effects of the tranquilizing agents, chlorpromazine, reserpine, and their derivatives in the treatment of both inpatient and outpatient psychotics and psychoneurotics. They have been experimenting with various blocking agents, including chlorpromazine, azacyclonal, sodium amytal, and desoxyn in the model psychoses produced by lysergic acid and mescaline.

Professor Cattell has been associated with Professor Hoch and Dr. Margaret O. Strahl in the collection and organization of data on pseudoneurotic schizophrenia. Follow-up studies are being continued on patients five or more years after discharge from the Psychiatric Institute or from private practice.

On January 1, 1956, Dr. Bernard Holland was appointed principal research scientist in internal medicine at the Psychiatric Institute. The focus of interest of the department has been metabolic disturbances in psychotic patients. Three aspects of metabolic relationships have been under study: the relationship of varying degrees of insulin sensitivity and resistance in schizophrenia; the activity of the adrenal cortex in schizophrenia; and the relationship of adrenalin and nor-adrenalin to psychiatric symptomatology.

A research project has been arranged in collaboration with Professor Perry Hudson of the Department of Urology to examine the function and the character of activity of the adrenal gland in schizophrenic patients. Patients with chronic schizophrenia who develop carcinoma of the breast are now offered the palliative bilateral adrenalectomy. Dr. Gerald Cohen and Professor Marcel Goldenberg of the Department of Medicine are collaborating with Dr. Holland to improve the methods for the quantitative determination of blood adrenalin and nor-adrenalin.

In the Psychoanalytic Clinic for Training and Research, Professor Sandor Rado, one of the founders, and director since its inception, retired on June 31, 1955. Professor Abram Kardiner, who was one of the co-founders with Professor Rado, became director on July 1, 1955. Professor George E. Daniels continues as associate director of the Clinic, and Professor George S. Goldman was appointed assistant director.

The Sandor Rado Lectureship was established in the department this year. The first guest lecturer was Professor Rado, who delivered a series of lectures on advanced psychodynamics.

The Psychoanalytic Clinic for Training and Research notes with regret the resignation of Dr. Angel N. Miranda-Rivera, who has returned to

Puerto Rico. Drs. Grace Baker and Robert Savitt have been appointed associate psychoanalysts in the Clinic, and Professor Kolb has been appointed to the status of a training and supervising psychoanalyst.

Professor Karush coordinates the supervisory program at the Psychiatric Institute for the training programs for residents in certain state hospitals. Professor Buchenholz is coordinator for and in charge of the program at the three hospitals in the plan. At Manhattan State Hospital, Dr. Daniel Shapiro is in charge of the teaching program, while Dr. Elias Savitsky supervises the first-year course and is assisted by Drs. George Naumberg and Julian Barish; Dr. Howard Davidman is responsible for the second-year course, aided by Drs. Max Cohen and John A. Cook. The program at Hudson River State Hospital is supervised by Dr. Joseph Lubart, with Dr. Kennedy. At the Harlem Valley State Hospital, Dr. Senescu is in charge, with Dr. Charles Socarides as instructor.

Professor Klein has continued her investigations concerned with changes in patients which occur during psychoanalytic therapy. Collaborating with her are Drs. Easser, Kennedy, Lubart, Senescu, Shapiro, and Mrs. Bluma Swerdloff.

Dr. Leon Moses has worked with Dr. Edmund Goodman of the Department of Surgery on the development of a three-lumen, naso-gastric tube and recording apparatus with which it should be possible to measure simultaneously the gastric mucosal electrical potentials, motility patterns, and secretory activity in a duodenal ulcer patient undergoing psychoanalytic investigation and therapy. Dr. Moses is also continuing his psychoanalytic and ballistocardiographic studies of patients with sustained and essential hypertension.

In the combined ulcerative colitis clinic Professor Karush and Dr. Senescu have continued their collaboration with Professor Charles A. Flood and his associates from the Departments of Medicine and Surgery on a long-term, follow-up study of the natural history and course of ulcerative colitis. Dr. Seymour Post joined this group and has been seeing patients in the clinic.

Dr. Lubart has been acting as psychiatric consultant to the thyroid clinic and, at the suggestion of Professor Sidney C. Werner of the Department of Medicine, has been studying a group of nontoxic goitre patients, including brief psychotherapy where needed.

Dr. Lothar Gidro-Frank and Miss Thelma Gordon are continuing the study of emotional factors in pelvic pain. This work is being done in cooperation with the Department of Obstetrics and Gynecology.

Dr. John O'Connor is studying the occurrence of psychosis in patients with systemic lupus erythematosus. A study is also being carried out by Dr. O'Connor, in cooperation with Dr. Nicholas Christy of the Department of Medicine, of the passage of cortisone into the spinal fluid after intravenous administration of the steroid is under way.

In the Vanderbilt Clinic, Professor Robert B. McGraw served as psy-

chiatric representative on the newly established committee to study and review patients recommended for therapeutic abortion in the hospital. Professor McGraw has served as chairman of the session on legal medicine at the New York State Medical Society.

Dr. Roy Craig continued his investigations on myotonia congenita and alcoholism, and Dr. John F. Oliven continued his study of the suicidal risk. Dr. Edward S. Tauber has been appointed adjunct clinical professor of psychology at the New York University Graduate School of Arts and Sciences.

At the Babies Hospital, Dr. Virginia Wilking devoted half her time to the seizure clinic and a half day a week to the cerebral palsy clinic; she is making a contribution to patient care in both these clinics and is also adding to her own professional knowledge and development.

Professor William S. Langford and Dr. Wilking have continued their studies on the reactions of children and their families to physical illness. At the moment the staff is engaged in the study of young adolescent girls suffering from anorexia nervosa.

SCHOOL OF PUBLIC HEALTH AND ADMINISTRATIVE MEDICINE

Professor RAY E. TRUSSELL, Executive Officer

The principal focus this year has been on the development of research and new educational projects.

There can be little question in America that the various fields of health work are converging on a common problem of medical care in the broad sense. This means that the hospital administrator who is the only hospital administrator in a community and the health officer who is the only health officer in an area and the voluntary agency executive and the health educator and the other health disciplines must work together around common problems in a field which is changing in emphasis and assignment of responsibilities. In the past it has been the practice to provide a curriculum for "hospital administration" students and "public health" students in two separate courses, with the result that these groups were neither prepared to work with each other in the community nor were they in harmony within the School. This year the first week of school started off with a course in group processes which mixed students from all types of curricula under the leadership of Dr. Irving S. Shapiro. These students worked around a variety of self-chosen subjects in a scheduled academic experience which was primarily intended to help them develop the ability to work with other professional colleagues in a community and to understand their role with respect to other people in problem-solving, as well as the value of the group approach to administrative problems.

There have been two additional approaches to unification of the student body. One has been the policy of cross-discipline teaching. Hospital students have been given survey courses in public health. This is not new but has received added emphasis. Public health students have been given survey courses in hospital administration. During the last two quarters of the academic year, one full day a week for the entire student body has been devoted to an examination and an extensive report on a major community health problem.

This year the entire student body was divided into six groups dealing with the problems of coordination of hospital and health facilities, suburbanization, relationships between voluntary and official health agencies, community mental health programs, health programs in underdeveloped countries, and community chronic disease programs. The students were in the field most of the time interviewing individuals concerned and gathering information. They wrote a group report which was mimeographed and distributed to all concerned. They were then examined during the last two weeks of school in a two-hour oral examination. Outside examiners were invited to participate. The student comments on this project have been very favorable. It has put them into the field and in contact with the realities of community programming for a variety of problems. It has forced them to crystallize their thinking and to learn to work with other disciplines. It has placed them in a position of having to interpret and defend their points of view to an examining board which could very well be likened to a board of trustees or a board of health.

Another approach in the educational field has been the development of the policy for adding outside members to doctoral committees. This year Dr. Eufonio Carrasco, who was brought here by the International Cooperation Administration for an intensive year of training and program development for the Philippines, had a productive and instructive year and was aided by a doctoral committee consisting of four faculty members from the School and one high-ranking public health official from outside the School, who also participated in the two-hour doctoral examination. It seems clear that the present focus of the School is on the preparation of administrative leadership in the various aspects of community health administration at the graduate level. The teaching of medical students, dental students, and nursing students which is done by the School is currently the subject of review also.

The School has been happy to participate in a cooperative teaching project with the Department of Nursing in the preparation of candidates for the Master of Science degree in maternity nursing. Our share of the teaching has been divided according to whether the experienced nurses who are entering this program come from and are going back to hospitals or whether they come from and are going back to public health work. In either case

the candidate's training is concentrated in the courses which will give her the most preparation for her future.

Certain additional required courses for all graduate students in the School have been added this year in view of the problems facing these future administrators of community health programs. Particularly, this has applied to the field of mental health and medical care.

A pair of related projects which involve physicians in the field of administrative medicine have been developing during the current year. The first of these is the project for the preparation of psychiatric administrators who are already occupying positions of varying responsibility throughout the nation. This project has come about in response to the interest of the American Psychiatric Association in upgrading standards of administration of mental institutions. A committee for the certification of mental hospital administrators with a subcommittee on training and education has been established in the American Psychiatric Association. It is examining psychiatrists who are occupying administrative posts. Columbia is actually the first to be in a position to develop a well-rounded and well-balanced program.

An excellent advisory committee with Professor Paul Hoch, State Commissioner of Mental Hygiene, as chairman is working with the School and the Department of Psychiatry in the development of a curriculum. Staff consultation is being provided by Miss Mildred Scoville, former executive associate of the Commonwealth Fund, who has already provided the advisory committee with a working document which has received excellent reception. It is proposed to admit not more than twelve such individuals for the first year and to undertake a trial curriculum. Interest has been expressed by two granting agencies in the United States in financing the instructional costs and in financing fellowships for such a program. Parallel to this and illustrative of a collaborative program with other specialties in the medical field is a trial curriculum being developed jointly with the Department of Psychiatry for residents in psychiatry.

Another challenging and important education project is that of the development of a division of continuation education within this School to become active as of July 1, 1956. This program which is intended to provide continuing education for people occupying key positions in the hospital and health agency field (either public or voluntary). This is the first time that a school of public health in this country will undertake a program of such scope and for such a large area. A faculty member to coordinate the program for hospitals has just been nominated—Mr. Harold Baungarten, Jr., who comes to us with local experience in small hospital work and national experience in working with the National Blue Cross Commission in collaboration with many important hospital agencies and personnel. He will begin his duties on June 15, 1956.

It is interesting to note that in addition to the psychiatrists referred to

above several other American physicians occupying various positions of responsibility are applying for programs which are clearly in the field of administrative medicine. At the present time an application is being processed from a faculty member of a department of preventive medicine; discussions are under way with a specialist in internal medicine who has been responsible for the teaching of internal medicine and for the administration of a department in a medical school and who wishes to make administration his career; there is also a physician who is currently enrolled on a half-time basis in this School and who is working at Montefiore Hospital with the home care program and other projects. One of the two foreign physicians admitted to date is coming from Israel for special training in the field of chronic diseases and hospital administration. It is the expectation that more physicians will be attracted by the diversified and intensified teaching program in administrative medicine and by the research projects which are to be described below. In addition, direct recruitment through deans of medical schools is contemplated during the next year.

No discussion of educational activities of the School would be well rounded without thorough acknowledgment of the cooperation of agencies providing service in the various fields for which the school is attempting to train administrators. Columbia is in a unique position geographically in that it is situated in an area in which there is a large number of individuals who are carrying on important and interesting projects in the various fields for which Columbia is providing educational or research opportunities. These individuals constitute a very important resource in our teaching program and are utilized in large measure in lieu of building up a sizeable number of junior staff members within the School itself. The new Commissioner of Health for Westchester County, Dr. William A. Brumfield, Jr., has been appointed associate professor in the School to facilitate the use of this very well-served community as a field area for training and research in community health. Other research projects have involved Montefiore Hospital, Presbyterian Hospital, and other important organizations in the area and due appreciation is extended to these many cooperating organizations.

The teaching facilities of the School have been improved in two significant areas. The provision of a new type of seating for the auditorium has greatly improved the situation which existed before. Through the generosity and cooperation of Dr. Leona Baumgartner, Commissioner of Health for New York City, additional space is being made available on the seventh floor of the building to house the new division of continuation education.

In spite of this added space, the expansion of activities in the School is creating a serious space problem, especially in view of the fact that we are in large measure dealing with students at the adult and experienced level and the seminar approach with small groups is used extensively. Continuation education will bring in additional groups of students from the sur-

rounding states; the course in psychiatric administration will require some duplication in scheduling because the majority of these students will be from government services and must be taught in certain subjects separately from the students who are being prepared essentially for the administration of the non-profit type of community hospital. Such programs increase the need for classrooms and faculty offices.

The corollary to operational experience feeding back into academic teaching as a method of keeping it alive is objective research. While public health research in the traditional sense is well known and its contributions well recognized in this country, the field of research in administrative medicine is very young by comparison. There is a genuine need for objective evaluation and research activities in the various facets of community health service encompassed by the concept of administrative medicine. Parallel to this is a tremendous need for the development of new research workers who are trained for the type of work to be done in the community, both through formal training within the institution and through supervised research experience. Such research cannot help but bring new knowledge into the field which at the present time often appears to be overly influenced in its teaching and frequently in its operation by opinion and social philosophy.

Public health leaders in this country are genuinely concerned with the personnel situation in the field and with the impact of the changing methods of meeting the health needs of the population. Furthermore, the needs themselves are changing, and research and evaluation are particularly important at this time.

The School is fortunate in having Mr. Dean Krueger who was assigned by the National Heart Institute to work with Professor Trussell for two to three years in the development of cardiovascular research. Mr. Krueger has been with the Commission on Chronic Illness for six years. His assignment is an outgrowth of a conference on epidemiology of cardiovascular disease held this year in which both Professor Clark and Professor Trussell participated.

During the year Professor Trussell has served as chairman of the Committee on Community Program Evaluation of the American Heart Association and subsequently was elected vice-chairman of the Council on Community Service and Education of the Association. He has served in the past year as vice-chairman of the Council on Hospital Planning of the American Hospital Association. He has also served as chairman of a four-day conference on the epidemiology of atherosclerosis and hypertension called by the American Heart Association and the National Heart Institute. He served as a director of the Welfare and Health Council of New York City until its recent reorganization, and subsequently was appointed chairman of both the advisory committee and the policy committee of the school health survey. In the American Public Health Association he is a

member of the program committee and has been appointed chairman of the resolutions committee for the coming year. He also served as a member of the program committee of the National Health Forum. He participated in the conferences at Ann Arbor on development of research in public health administration and served as a member of the editorial committee and as chairman of the subcommittee on implementation of the research. In addition, he has been elected director of the Rip Van Winkle Foundation and appointed a member of the New York City Advisory Committee on the inventory of illness.

During the year Professor Trussell, with Professor Barnett as co-director, limited his direct research interests to two projects: The first is prepayment coverage in New York State, which is a fact-finding project for the joint legislative committee on Health Insurance Plans. The project administrator is Mr. Frank van Dyke. The second is on the hospital-physician relationship and prepayment principles as they affect the quality of medical care.

DIVISION OF BIOSTATISTICS

The teaching activities of the division were similar to those of previous years insofar as the public health students were concerned. The first course, introduction to vital statistics, was given to all students of the School of Public Health except the parasitologists, a total of seventy students. The course in the elements of statistical analysis was attended by about forty students. In addition, approximately twenty staff members of various departments of the Medical School attended the lectures.

A course in life table methods as applied to chronic diseases was given to ten students. An intensive course on advanced statistical analysis extending throughout the third and fourth quarters was given to six students, most of whom are working for a Master of Science degree in biostatistics. Two other students took some advanced statistics on an elective basis. In view of the statistical background of the students taking the advanced course, it was possible to cover much more material, theoretical and practical, than in previous years. The frequent requests for assistance from investigators at the Medical Center formed a fruitful basis for discussions and laboratory material. These consultations formed an integral part of the course.

The teaching of statistics to medical students consisted of a series of fourteen lectures and problem assignments in the first year. In addition, two lectures were given as part of the third-year course in preventive medicine. This was the last year during which Dr. John Silson gave the independent sequence of ten lectures on statistical methods to the third-year students.

Dr. Agnes Berger has continued her research on appropriate methods of evaluating follow-up data. Professor John W. Fertig has resumed his collaboration with Professor Neal W. Chilton on statistical methods in dental research. Professor Fertig has devoted considerable time to unifying the chi-square approach to enumeration data with the analysis of variance approach

to measurement data. The division has continued to give frequent consultation to the research workers of the whole Medical Center.

Professor Fertig has continued his close cooperation with the family health maintenance demonstration at Montefiore Hospital; with the New York City Health Department in its development of statistical projects; and with the Sidney Hillman Health Center in its study of arteriosclerosis. He is also a member of the committee on lipoproteins and atherosclerosis of the National Heart Institute. In addition, he helped the Planned Parenthood Federation plan a pilot survey on contraceptive attitudes among American women.

Professor Fertig spent several weeks at the School of Public Health in São Paulo, Brazil, where he gave lectures and seminars in biostatistics to staff members of the Medical School, the School of Public Health, and various research institutes. This activity was under the auspices of the Pan-American Sanitary Bureau.

It is with great regret that the division announces the resignation of Miss Anne Baranovsky, instructor in biostatistics, an invaluable member for the past seven years.

DIVISION OF EPIDEMIOLOGY

Professor E. Gurney Clark gave lectures as part of the undergraduate public health course in dentistry, participated in the preventive medicine course for third-year medical students and in the lecture schedule to nurses. Scheduled courses by the staff in the School of Public Health and Administrative Medicine included *Epidemiology 203*, first quarter, six hours per week; *Epidemiology 204*, second quarter, ten hours per week; *Public Health 205*, third quarter in collaboration with the division of tropical medicine, nine hours per week for five weeks; *Epidemiology 212*, fourth quarter, three hours per week.

Interest in the hypertension project continues but because of lack of funds and personnel very little progress has been made since the termination of the grant from the Commonwealth of Massachusetts. The only work has been a re-evaluation of data collected in the earlier field studies and a period of further planning for two additional studies: a small study of blood pressure variability and measurement; and the long-term study of blood pressure in a population group. Collaboration with the Bureau of Applied Social Research has continued.

DIVISION OF HEALTH EDUCATION

Eight students were enrolled for the Master of Public Health degree with special interest in health education. Three of these are from the New York City Health Department.

Professor George Rosen is continuing his research on the analysis of periodic examinations in two medical groups affiliated with the Health In-

insurance Plan of Greater New York. These studies will probably be completed in the fall of 1956. At the same time, Professor Rosen is also preparing a *History of Public Health* which will be finished by June, 1956.

Professor Rosen has participated in meetings and presented papers at National University of Mexico Faculty of Medicine, Austin Flint Society of State University of New York College of Medicine in Brooklyn, Harvard University School of Public Health, and the Columbia University seminar on the Renaissance.

During the early part of 1956, a committee of medical students representing all four classes at the College of Physicians and Surgeons invited Professor Rosen to meet with them and to help them organize a medical history society. In addition, the committee invited Professor Rosen to give an orientation course in the history of medicine for medical students, nursing students, faculty members, and others who might be interested. The outcome has been the organization of the Columbia-Presbyterian Society for Medical History which held its first meeting on February 14, 1956.

DIVISION OF HOSPITAL ADMINISTRATION

During the past year, the faculty members of the former Institute of Administrative Medicine were not only occupied with the large class of hospital administration candidates but also carried the primary responsibility for direction of the candidates in administrative medicine.

In September, 1955, a class in administration was admitted in which there were twenty-eight students in hospital administration and four in administrative medicine. We had thirty-one students serving in residencies throughout the country. Again this year the majority of the students found their residencies in the New York metropolitan area.

Beginning in March, we have instituted a monthly seminar to which the residents in Massachusetts, New Jersey, New York, and Pennsylvania are invited. Again this year thirty students returned from their residencies for a semester of classroom work, mostly in seminar case studies and group discussions.

The two-day conference on nursing administrative problems was conducted again this year during the first part of May at the Thayer Hotel in West Point, New York. Dr. Irving Shapiro, who works in group processes with our students, was the moderator of the meeting.

There has been little or no case material available to be used by schools teaching hospital administration. The Kellogg Foundation provided funds for this study in several schools, one of which was Columbia University. We were fortunate to be able to obtain the services of Mr. George Billington, one of our recent graduates. During the early summer months, Mr. Billington and Professor E. Dwight Barnett spent several days at Harvard University with Professor Towle getting acquainted with the case method of teaching as set up at the Harvard School of Business. The field of hospital

administration is at present devoid of any modern up-to-date textbook on the organization and management of hospitals. The Kellogg Foundation also sponsored a program for the development of such a text. Professor Barnett, with the aid of Mr. Rudolf J. Pendall, who came to our faculty for this purpose, is preparing this new textbook.

The third research program set up and put into operation during this year has been a study of the selection of students for administration. It has been difficult to know what particular attributes and educational backgrounds of students would be most effective in administration. This study is to look into the job of the administrator in the health field and to determine attributes necessary for a good administrator. From these it is hoped to be able to develop a type of background which might produce an optimum candidate for administrative training. Dr. Mottram Torre, associate in psychiatry, is spending a portion of his time guiding this study. We have also been fortunate in obtaining the services of Dr. Ruth Bishop Heiser, who has had considerable experience in this field.

The fourth program is the study of the teaching of group dynamics for the purpose of interdisciplinary problem-solving, which was mentioned in the description of the School. All of these programs have been sponsored from funds provided by the Kellogg Foundation.

A citizens committee of New York representing the New York Academy of Medicine, Hospital Council of Greater New York, and the United Hospital Fund engaged the administrative research division of the School to make a study in the convalescent care field. It is the purpose of this study to ascertain what the problems of convalescence are and to identify, if possible, convalescent care. This study has been under the direction of Dr. Magda P. Shorney. We have obtained the services of Miss Virginia Brown, a recent graduate of our course in hospital administration.

During the development of these research programs, Professor Clement C. Clay has been in charge of the detail of the course for hospital administration; Dr. Shorney has been active in both teaching and research.

During the academic year, Professor Clay continued to serve on the examination development committee of the American College of Hospital Administrators. In cooperation with the professional examination service of the American Public Health Association, the committee developed an examination of the objective type to be given to candidates for advancement to membership. He is also serving as a special examiner for the Civil Service Commission, Department of Personnel of the City of New York, in the examination for positions in the Institutional Inspection Service of the Department of Hospitals. Professor Clay was also a lecturer in hospital administration in the division of nursing education of Teachers College and a member of the committee on home care of the Hospital Council of Greater New York.

Dr. Shorney, in addition to being project director of the convalescent care

study, addressed the Pan-American Medical Women's Alliance in March in Santiago, Chile.

Professor Barnett continued to serve as a member of the Board of Trustees of the National League for Nursing; delegate to the National Health Council representing the National League for Nursing; member of the Committee on Extension of Hospitals and Other Facilities of the American Medical Association; member of the Joint Committee of the American Medical Association and the American Hospital Association on Hospital-Physician Relations. He is also a member of the Technical Advisory Committee of the Commission on Financing of Hospital Care; Advisory Committee on Hospitals of the W. K. Kellogg Foundation; Committee on Home Care of the Hospital Council of Greater New York. He continued to serve as chairman of the Committee on Planning of the Institutes which are financed by the Kellogg Foundation and operated by the Association of University Programs in Hospital Administration. These institutes are set up to improve the quality of teaching hospital administration in the university courses. He served as a member of the Board of Trustees and of the Master Plan Committee of the Hospital Council of Greater New York; and also as secretary-treasurer of the American Association of Hospital Consultants.

Some of the guest lecturers during the year have been:

Kenneth C. Babcock, M.D., director, Joint Commission on Accreditation of Hospitals, Chicago

George Baehr, M.D., president and medical director, Health Insurance Plan of Greater New York

James Berkman, M.D., pathologist, Long Island Jewish Hospital, New Hyde Park, New York

Newman M. Biller, executive director, The Home for Aged and Infirm Hebrews of New York

Simon Bienes, architect, New York

Martin Cherkasky, M.D., director, Montefiore Hospital, New York

Dean Conley, executive director, American College of Hospital Administrators, Chicago

William A. Gately, executive director, Hospital Bureau of Standards and Supplies, New York

James M. Hershey, M.D., hospital consultant, New York State Department of Health, Office of Medical Defense

John W. Kauffman, administrator, Princeton (New Jersey) Hospital

Walter C. Kirschner, United States Hoffman Machinery Corporation, New York

Miss Helen C. Lincoln, medical records librarian, Society of New York Hospitals

Leland J. Mamer, director of buildings, St. Luke's Hospital, New York
E. Alliene Mosso, supervising dietitian, St. Luke's Hospital, New York
Hayden C. Nicholson, M.D., executive director, Hospital Council of Greater New York
Andrew Pattullo, director, Division of Hospitals, W. K. Kellogg Foundation, Battle Creek, Michigan
Mrs. George A. Perera, president, Women's Auxiliary of Presbyterian Hospital, New York
Stanford Pulrang, M.D., urologist, St. John's Riverside Hospital, Yonkers, New York
Anthony J. J. Rourke, M.D., hospital consultant, New Rochelle, New York
Harvey Schoenfeld, director, Bernert Memorial Hospital, Paterson, New Jersey
Cornelius M. Smith, attorney, Will, Folsom and Smith, New York
John G. Steinle, attorney, Cresap, McCormick and Paget, New York
Ella May Thompson, R.N., associate director, National Association for Practical Nurse Education, New York
Helge Westermann, architect, New York

In addition, many members of the staff of the Presbyterian Hospital and of the faculty of the College of Physicians and Surgeons delivered lectures.

The course on prepayment plans which has been sponsored by the Blue Cross Commission was given twice during the year. The commission sent members of their staff for some of the lectures. They were as follows:

Richard Jones, director, Blue Cross Commission, Chicago
Antone G. Singsen, assistant director, Blue Cross Commission
Raymond Mody, assistant director, Blue Cross Commission
John H. Hayes, chairman, Commission on Hospital Financing
George Bugbee, president, Health Information Foundation

DIVISION OF OCCUPATIONAL MEDICINE

As in the past, the division of occupational medicine has offered formal courses, such as an introduction to occupational medicine, required of all students in the School, and the occupational diseases, required of students who plan to specialize in occupational medicine.

A series of twelve sessions of one hour each dealing with occupational medicine was given to the fourth-year undergraduate students. The major teaching in preventive medicine and public health is done in the third year.

A fifteen-year study of the occupational potentialities of persons with heart disease is nearing completion. Professor Leonard J. Goldwater and Professor Beatrice Mintz are participating in the study, while the observation of patients is being done at the work classification unit of Bellevue

Hospital. A study of the mechanism of anemia in lead poisoning is being conducted in collaboration with the Division of Industrial Hygiene of the New York State Department of Labor.

Professor Goldwater continued his activities in the American Heart Association; Group Health Insurance, Incorporated, as a member of the Board of Directors and of the executive committee of the Board; the New York Hotel Trades Council and Hotel Association Health Center as a member of the Medical Advisory Council and of its executive committee and as chairman of the subcommittee on preventive medicine and health education; the New York State Department of Labor, Division of Industrial Hygiene, as consultant industrial hygiene physician; American Academy of Occupational Medicine as secretary and member of the Board of Directors; the American Public Health Association; and the New York City Department of Health as member of the Poison Control Center Advisory Committee.

DIVISION OF PARASITOLOGY

The teaching programs in the School of Public Health and Administrative Medicine and in the medical school have continued along the lines developed several years ago. The availability of the Tropical Diseases Diagnostic Service of the New York City Health Department has added greatly to the instruction. Professor Howard B. Shookhoff and Dr. Max M. Sterman have been of great assistance and their cooperation is greatly appreciated.

Two graduate students, Mr. Allen W. Mathies and Mr. Walter B. Stahl, completed work for the Master of Science degree and have been accepted by the Graduate Faculties to work for the Ph.D. degree in the field of parasitology. Both have fellowships from the United States Public Health Service.

Professor Harold W. Brown continued his active cooperation with the various departments of the Medical School. He participated in ward rounds, clinics, and clinical-pathological conferences with the Departments of Pediatrics, Medicine, Surgery, and Neurology. He gave lectures in the course on practical therapeutics given jointly by the Departments of Medicine and Pharmacology. Over one hundred consultations were held with staff members concerning patients with parasitic diseases in the various hospitals of the Medical Center.

The Division of Parasitology has continued to arrange special work in tropical medicine for fourth-year medical students. During the current year four students spent their senior elective period in the Aluminum Company of America Hospital in Dutch Guiana. In addition to their clinical experience, two of the students made a study of piperazine therapy in human ascariasis. They also collected blood specimens from the aborigines for virus studies with Professor Claus W. Jungeblut of the Department of Microbiology. The other two students studied the hemoglobin patterns of the Bush Negroes, a joint project with the division of parasitology and Dr.

Helen M. Ranney of the Department of Medicine. To date, ten medical students have participated in the Dutch Guiana program and as a result five scientific articles have been published and five additional ones are in preparation. Arrangements have recently been made for students to spend their elective period in the hospital of the Firestone Company in Liberia and the Government Hospital on St. Thomas, Virgin Islands.

Professor Brown, Professor Kathleen L. Hussey, and Dr. Kam-Fai Chan have continued their studies on the chemotherapy of helminthiasis. An extensive series of new chemicals, supplied by pharmaceutical companies, are being tested in experimentally infected animals. An analysis of the relationship of chemical constitution to anthelmintic activity is in progress, a joint program with the chemistry department of the Burroughs Wellcome Research Laboratory. Studies are being continued on the mode of action of chemotherapeutic agents on parasitic worms. The group has made fundamental studies on the biology of the pinworm and the host-parasite relationships. Two graduate students are cooperating in these studies.

Professor Shookhoff served as president of the New York Society of Tropical Medicine. Professor Brown continued to serve on the Board of New York State Medical Examiners and on boards of directors of several international health agencies. Professors Brown, Hussey and Dr. Chan continued to assist the administration of the North Jersey Training School in the control of amebiasis in this institution, a condition which was epidemic there several years ago and resulted in five deaths. Elimination of enterobiasis from this institution is also being gradually achieved.

During his sabbatical leave, Professor Brown visited medical schools, hospitals, and public health activities in the Middle East, Africa, South America, and Central America. He lectured on the chemotherapy of parasitic diseases at the medical schools of Teheran and Cairo.

Dr. Sterman spent two months in Costa Rica studying tropical diseases under a fellowship from the China Medical Board of New York.

Professor Hussey has continued her summer studies on the larval stage of trematodes at the University of Michigan Biological Station with Dr. W. W. Cort, research professor of parasitology of the University of North Carolina.

During the summer of 1955, Professor Roger W. Williams studied the biology of bloodsucking Diptera at the Bermuda Biological Station. Recently Professor Williams received two grants in order to study at the London School of Tropical Medicine and Hygiene.

DIVISION OF PUBLIC HEALTH PRACTICE

The division of public health practice has a variety of teaching responsibilities which are dependent upon the objectives of the different types of students enrolled in various courses. During the present year, the division has been responsible for required courses in the School of Public Health and Administrative Medicine for candidates for the Master of Public Health

and the Master of Science degrees in hospital administration; in the School of Dental and Oral Surgery for the senior class; and in the Department of Nursing for the freshman class. In addition, students enrolled in the Department of Nursing as Master of Science candidates in maternal and child health nursing, and in Teachers College as graduate students in public health nursing administration and in public health nutrition took the courses required for the Master of Public Health degree. Elective courses for the M.P.H. and hospital administration candidates, the repetitive teaching in the required course for third-year medical students, and curriculum responsibilities shared jointly with other divisions round out the current teaching activities of the division.

Elective courses are offered to all Master of Public Health candidates in the second semester which, through the use of discussions of current activities in public health from the administrative point of view and through problem-solving techniques, guide the students in developing an understanding of administration as applied in public health practice in various governmental and voluntary agencies.

The Master of Public Health required courses have been redesigned to provide a minimum of lecture devoted to historical aspects and basic fundamentals, and a maximum of small group seminars and problem-solving discussions.

The course for hospital administration students was developed to provide a survey of community health agencies: the legal basis for the official agency; its duties and responsibilities; the current trends in program; the type of organization which usually prevails; its relationships at the federal, state and local levels; the origin, functions and organization of different types of voluntary agencies and their relationship to the official health agency. The relationships between these health agencies and hospitals was then further explored.

The general introductory course in public health for the first-year student nurses was continued.

Professor Margaret W. Barnard, assisted by Dr. Mabel Ingalls, has been engaged in determining the potential needs for continuation education of individuals working in public health agencies and has used the New York State Health Department's White Plains Region as a prototype.

Professor William C. Spring, Jr., has continued to serve as chairman of the health division of the Welfare and Health Council of New York City and as a member of the central planning board of the same organization. He has also continued as a member of the committee on medical information of the New York Academy of Medicine and its subcommittee on the Eastern States Health Education Conference; he participated in the program of the Conference this year.

Professors Spring and Barnard have been active participants in the development of the University Seminar on the role of the health professions

which was organized this year. Professor Spring has coordinated the School's activities in conjunction with a workshop on community organization in the field of health being given by the New York School of Social Work in cooperation with the School of Public Health and Administrative Medicine, the National Health Council, and United Community Funds and Councils of America.

Professor Barnard has continued to serve as a member of the public health committee of the Medical Society of the County of New York and of the national health and safety committee of the Girl Scouts of America; as consultant to the training committee of the New York City Department of Health, and as chairman of the health officers section committee on professional education of the American Public Health Association. Professor Barnard has also accepted chairmanship of the Washington Heights Riverside District Health Committee, membership on the New York Tuberculosis and Health Association Board of Directors, and membership on the advisory committee of the Central School for Practical Nurses of the Department of Hospitals, on the medical advisory committee of the Planned Parenthood Federation of America, and on the committee on standards for psychiatric clinics public health committee of the Academy of Medicine.

Dr. Mottram P. Torre has devoted some time to consultation on selection, training, and utilization of overseas personnel for the United States Government. Dr. Torre has also served as a consultant to a committee on selection of Fulbright Fellows for Asia, and as a member of the International Relations Committee for the Advancement of Psychiatry. In addition, among other activities, Dr. Torre has served as psychiatric consultant to the United Nations Medical Department and as chief of the Out-Patient Psychiatric Clinic of St. Luke's Hospital. He represented the School on the Morningside Heights Mental Health Committee.

In September, 1955, Professor Spring became study director of a long-term project known as the school health survey, under the Welfare and Health Council of New York City. This project is sponsored jointly by the Board of Education and the Department of Health of New York City.

Professor Neal W. Chilton, who has returned from military duty, has been the principal investigator on design and analysis of dental research studies. He has been a consultant on the design of a research study on dentifrice at the University of Rochester-Eastman Dental Dispensary and with commercial concerns on the testing of clinical products; he has also worked on the new Russell index for studying the epidemiology of periodontal disease.

DIVISION OF SANITARY SCIENCE

The teaching activities of the division have been expanding and have been revised again this year in order to give each of the several professions closely related to public health a better understanding of the control of our environment through the basic principles of sanitation. In addition, the

course in principles of sanitation has also been revised to include several phases of sanitation that were not included previously in this course: accident prevention and safety, radiological health, sanitation abroad, interstate and international carriers, as well as school, industrial, and housing sanitation.

The other courses in sanitary science have been planned primarily to meet the needs of students from less developed countries where sanitation in most instances is the number-one problem. The primary objective of these courses has been to provide these students with a more detailed consideration of the fundamental concepts of prevention of disease through control of the environment but at a much more basic level than is done in this country, with the possible exception of some of our most backward rural areas.

Professor Alvin R. Jacobson, associate professor of sanitary science, went on active duty with the United States Public Health Service as of June 1, 1956. During the next several months, which will make up his sabbatical leave, he will be assigned to the Public Health Service training center in Cincinnati and will make an intensive review of the problems of air pollution, radiological health, and in-service training methodology.

DEPARTMENT OF RADIOLOGY

Professor HAROLD W. JACOX, Acting Executive Officer

A number of changes in the professional staff have occurred during the year. Professor Russell Wigh resigned as associate professor on March 10, 1956, to become professor of radiology at the Medical College of Georgia at Augusta. Dr. Louis A. Rottenberg was appointed associate in radiology. Drs. Donald W. Johnson, Samuel H. Madell, and James M. Monaghan III, former residents here, were appointed instructors.

Professor Jacox became a member of the executive committee of the New York Roentgen Society for 1955-1956. He was appointed associate editor of the *Journal of Radiology*, and continues to be an abstractor for *Excerpta Medica*. He is also co-editor with Professor Morton M. Kligerman of the Radiation Therapy Section of the *Year Book of Radiology*, and continued to serve on the radiological coordinating committee of the New York County Medical Society. Professor Jacox and Professor C. Zent Garber of the Department of Pathology are collaborating on a study of the effects of radiation on bone. Professor Jacox is also working on a clinical study of the results of the radiation treatment of cancer of the urethra for presentation at the Eighth International Congress of Radiology in Mexico City.

Professor John Caffey reports that the principal investigation in pediatric radiology is the continuing one of the study of the neonatal pelvis and the acetabular angles in relation to the pathogenesis of congenital dysplasia and congenital dislocation of the hip. Dr. Steven Ross is concluding a report on

the normal ischiopubic synchondrosis which demonstrates that swelling, irregular mineralization, and even progressive demineralization of this structure in some cases develop in healthy children. Dr. Samuel Madell is studying some interesting variations in the mineralization of the normal pubic bones which may simulate fractures during the first month of life. Dr. Ross is completing his studies on the maturation of the proximal end of the femur and the maturation of the foot with special reference to the shape and density of the calcaneal apophysis at all ages.

The largest investigative project in the Babies Hospital x-ray unit concerns the radiologic examination of several thousand unselected newly born infants, in conjunction with the clinical study of the fate of the fetus in several thousand pregnancies. Already this study has yielded valuable data on some of the roentgen features of the normal infant, which will probably become the accepted standard in radiologic diagnosis. A study of the normal acetabular angles during early infancy is now in progress. Professor Caffey completed two projects: one in conjunction with Dr. Ross on the pelvic changes in mongoloid deficiency during early infancy; and a second in conjunction with Dr. Madell on ossification of the pubic bones at birth. Drs. J. Luther Jarvis and Jerome Nadelhaft began studies on the experimental use of some iodinated organic contrast agents for the roentgen examination of the alimentary tract in infants and children. Dr. Nadelhaft is making a radiographic study of the roentgen features of the simulation of colonic obstruction at the splenic flexure by pancreatitis. With Dr. Kent Ellis he has two clinical investigations under way: one on the roentgen aspects of hyaline membrane disease, and the other on the roentgen appearance of the lungs in one thousand apparently normal newborn infants. He is also continuing a study of all salivary gland tumors treated at Presbyterian Hospital. With Dr. Robert Hochstim he is carrying on a study of the differential uptake in liver tissue of radioactive iodinated human serum albumin in the diagnosis of metastases. Dr. Kent Ellis has taken charge of the angiocardio-graphic procedures and will participate in the research activities of the cardiology group, and Dr. Samuel Madell is cooperating in the same way with the Department of Orthopedic Surgery.

Professor Juan M. Taveras is working with Professor Lester A. Mount of the Department of Neurological Surgery on the evaluation of radiation therapy for gliomas of the optic nerve and chiasm. They are also studying the results of surgical treatment of intracranial aneurysms by angiography and the angiographic demonstration of collateral circulation of the cerebral hemispheres. With Dr. Charles M. Posner he is working on the radiologic aspects of cerebral angiography in children and on cerebral angiography in encephalo-trigeminal angiomas. With Professor Edward B. Schesinger of the Department of Neurological Surgery and Dr. Francis M. Cummins he is determining the value of radiation therapy in gliomas of the third ventricle and pinealomas. In collaboration with Professor Schlesinger, the

comparative diagnostic value of myelography in postsurgical intervertebral disc syndromes has been studied, and with Dr. Cummins he has been working on the incidence and significance of junction dilation of the posterior communicating artery of the brain. A study of the myelographic aspects of venous and arteriovenous malformations of the spinal cord is being made with Dr. Catherine J. Dalton. The clinical correlation of neurologic and psychiatric findings with roentgenographic evidence of cerebral atrophy is being investigated with Dr. John Nardini. He is collaborating with Drs. Nadelhaft and Paul Wermer of the Department of Medicine on a study of unusual roentgen manifestations of reticuloendotheliosis. With Drs. Howard Tucker and Labe Scheinberg he is studying the morbidity of cerebral angiography. With Professors Schlesinger, Harald H. Rossi, and Edith H. Quimby he is working on the development of improved techniques in radioactive isotopic localization of brain tumors.

Dr. Donald J. Barnett is working on a clinical study of craniopharyngioma, and with Dr. Ralph Schlaeger is investigating the significance of localized thinning of the cranial vault. Professor Russell Wigh in association with Dr. Norah duV. Tapley made studies on the roentgen characteristics of cancer metastatic to the large bowel.

The electrogastrographic group under the direction of Professor Edmund N. Goodman is now obtaining a radiographic record of the position of the gastric electrodes during each test. The Department of Radiology is co-operating in differentiating gastric cancer from other conditions discovered by radiologic means.

Professor Gerhart S. Schwarz made a clinical correlation of the use of orthometric pelvimetry in obstetrical roentgenometry. He has continued research on the integration of cephalopelvimetry into an obstetrical ward service, and on the interpediculate distances in the growing human spine with special reference to the sacrum. In collaboration with Professor James B. Campbell of the Department of Neurological Surgery, he is continuing a project involving the taking of rapid-sequence radiographs in a study of innervation of the urinary tract from the urethra to the renal pelvis in animals. In collaboration with Dr. Donald W. Johnson a statistical study is in progress to test the validity of a new roentgen sign which it is hoped will permit a reliable differentiation between benign and malignant gastric ulcers. In collaboration with chief technician, George K. Nixon, the optimal position of secondary x-ray grids is being investigated. The animal x-ray unit continues to be used extensively by various research groups.

Professor Josephine Wells was one of the workers on a cardiology-notebook project for medical students which was compiled by the Cardiovascular Teaching Committee. She continues clinical research on rheumatoid spondylitis and arthritis for publication as a monograph by the New York Rheumatism Association. Professor Wells completed a study of calcified liver metastases, is making a survey of a large number of gastrointestinal

series done more than five years ago to determine accuracy of the roentgen method, and is starting a survey of radiation-induced leukemia.

Dr. Francis M. Cummins is now serving as the x-ray representative on the Cardiovascular Teaching Committee. Dr. Catherine J. Dalton completed a study of the evaluation of the paraspinal line in roentgen examination of the thorax. In collaboration with Professor Taveras, she is working on the myelographic aspects of venous and arteriovenous malformations of the spinal cord. Drs. Dalton and Madell are working on roentgen detection of lesions of the pancreas. Dr. Donald W. Johnson is working on the differential roentgen characteristics of gastric ulcer and linitis plastica.

Professor Morton M. Kligerman with Professor Howard Vreeland and Mr. Jan Havinga worked out a graphical method for the localization of radium sources for dosage calculation. With Professor John W. Fertig of the School of Public Health and Administrative Medicine and Drs. Anna Silverman and Kent Ellis, he made a comparative study of the effectiveness of pyridoxine and dramamine on clinical radiation sickness. A statistical appraisal of the use of radioactive iodinated human serum albumin for the detection of liver metastases was made with Professor Quimby, Professor David V. Habif of the Department of Surgery, and Dr. Madell. Professor Kligerman is continuing investigations on multimillion volt x-ray and electron-beam cancer therapy. He is conducting an experiment with Dr. Daniel M. Shapiro on the augmentation of radiotherapeutic effects by multi-combination cancer chemotherapy. Professor Kligerman, in conjunction with Professor Algernon B. Reese of the Department of Ophthalmology and Drs. Tapley and George A. Hyman of the Department of Medicine, is conducting a controlled study on the treatment of retinoblastoma by radiation alone and by triethyleneamelamine and irradiation. He and Professor Virginia Kneeland Frantz of the Department of Surgery are continuing research on a study of carcinogenesis from external and internal radiation in the thyroid of the Long-Evans rat. Professor Kligerman was recently appointed consultant to the editor of *Cancer Yearbook*.

As in the past, the activities of the radiological research laboratory have been divided between research projects for the Atomic Energy Commission and problems related to therapeutic radiology and medical uses of radioactive isotopes. While the work carried out for the Atomic Energy Commission is concerned with problems of special interest to the Commission, it generally involves fundamental problems in radiological physics and radiobiology.

The radiological physics section is primarily concerned with absolute measurements of both the quantity and quality of radiation as delivered to tissue. In addition to investigating new methods of such measurements, considerable effort is being spent in determining certain parameters which are essential in the precise dose measurements involving the ionization method. Radiobiology under the Atomic Energy Commission contract has been limited to

specialized problems which have bearing on radiation protection and which may shed some light on the biological action of radiation. The annual report of the work on the Atomic Energy Commission project, consisting of 150 pages, has been submitted to the Commission and will be published in the next few months.

Most of the work in clinical radiation physics has been centered around the betatron. The installation of the machine in Presbyterian Hospital was completed on March 30 and the first patient was treated on September 20. In the intervening period a considerable amount of work had to be done to insure constancy of operation, proper alignment, and accurate dosimetry. A number of accessory pieces of equipment had to be built. These include a treatment table designed by Professor Gioacchino Failla, various monitoring ionization chambers, treatment cones, and absorbers used in special treatment procedures. Problems which have been pursued in particular involve a number of depth dose measurements, both near the skin surface and at greater depth in phantoms.

Work has continued on methods to improve determination of dose delivered at a specific region in the body. During the past year detailed tables and procedures have been prepared for the calculation of isodose charts on a basis of currently available depth-dose data.

A study is currently being carried out on the effects of radiation quality, target-axis distance, and field size on the efficiency of rotation therapy of lesions in different parts of the body. Professor Quimby will present this material at the meeting of the Eighth International Congress of Radiology in Mexico City in July.

The radioisotope laboratory, under the supervision of Professor Quimby, receives and standardizes all radioactive isotopes of iodine, phosphorus, gold, sodium, and potassium, and dispenses them to clinical and research departments. About one hundred and fifty shipments of the various isotopes were processed. In cooperation with the medical, surgical, and radiological departments, regular diagnostic and therapeutic procedures are carried out. Over three thousand diagnostic iodine studies were made; about three hundred and fifty therapeutic doses of iodine, phosphorus, and gold were dispensed. The laboratory also cooperates with members of the clinical staff and others in new researches involving the use of radioactive isotopes.

Members of the staff of the radiological research laboratory take part in a wide variety of activities, both within the institution and in national and international organizations. Professor Failla has continued to serve as chairman of the radioisotope committee of the Medical Center, and Professor Quimby is also a member of this committee. For four years the institution has received from the Atomic Energy Commission a "general authorization" for the use of radioactive isotopes. Under this authorization projects for the use of these substances are not subject to review by the Atomic Energy Commission, but the necessary review is done by the local isotope committee.

Professor Failla has continued to work with the Atomic Energy Commission and other agencies, both civilian and military, on problems related to atomic energy. He is chairman of the Advisory Committee for Biology and Medicine of the Atomic Energy Commission, and consultant to several of the AEC installations. He is chairman of the radiation instrument panel of the Armed Forces Special Weapons Project, and a member of the genetics panel of the National Academy of Sciences. He is also a member of the International Commission on Radiological Units, vice-chairman of the International Commission on Radiological Protection, member of the National Committee on Radiation Protection, and chairman of corresponding subcommittees of the two protection organizations. He was a delegate to the "Atoms for Peace" Conference in Geneva in August, 1955, where he presented a paper entitled "Dosimetry of Ionizing Radiations." He also spent two weeks in Geneva in April, 1956, at meetings of the two International Commissions.

Professor Quimby is a member of the Advisory Committee on Isotope Distribution of the Atomic Energy Commission, of the National Committee on Radiation Protection, and of the subcommittee on handling and disposal of radioactive isotopes of the International Commission on Radiological Protection. She is the official delegate of the American Radium Society to the Eighth International Congress of Radiology. At the Commencement Exercises of Douglass College on June 6, Professor Quimby was awarded an honorary degree of Doctor of Science.

Professors Failla and Quimby continue to be members of the subcommittee on biophysics of the Joint Committee on Graduate Instruction of Columbia University. They are both consultants to various medical and scientific groups. Professor Harald H. Rossi is chairman of a subcommittee of the National Committee on Radiation Protection on Neutron Protection, and has completed the draft of a handbook on that subject. Professor Roberts Rugh was sent on an "Atoms for Peace" mission, sponsored jointly by the AEC and the State Department, for the specific purpose of discussing radiobiological research with marine forms at the biological station in Naples.

Professors Failla, Quimby, Rossi, and Rugh are all actively concerned with teaching programs. Courses are given in radiological physics, clinical uses of radioactive isotopes (with Professor Sergei Feitelberg of Mt. Sinai Hospital and several guest lecturers), special problems and technics of biophysics (with other members of the Physicians and Surgeons staff). Several students are working for the Ph.D. degree in biophysics. The residents in radiology, in addition to the courses in radiological physics and radioactive isotopes mentioned above, receive special instruction and practice in isotope techniques.

Professors Failla, Quimby, Rossi, and Rugh have appeared on programs of national and local radiological, medical, physical, and other societies, and

have given a number of lectures to medical and lay audiences. Professors Quimby and Rugh continue to be active in radiological aspects of civilian defense.

Messrs. Carl B. Braestrup, George Hertsch, and Richard T. Mooney are making an extensive series of transit dose measurements for radioactive cobalt rotating teletherapy. Messrs. Braestrup and Mooney are carrying out attenuation measurements of scattered radioactive cobalt radiation in lead and building materials. The purpose of this investigation is to study the shielding requirements against cobalt 60 scattered radiation. They are making a study of materials for gamma and x-ray protection and specifically for a radioactive cobalt teletherapy protective design, and isodose patterns for combined and nonuniform longitudinal and transverse source motions with the cobalt rotating beam unit. Messrs. Mooney and Braestrup and Miss Eleanor Englemann are making isodose patterns for moving radiation-beam therapy.

Professor S. Allan Lough and Mr. Hertsch are developing a method to estimate radioactive iron and chromium in the same blood sample to meet the needs of hematologic studies. With Mr. Braestrup they are planning an organization of hospital facilities to receive, monitor, and decontaminate patients with radioactive contamination.

Professor Arnold L. Bachman has been working on the problems of roentgenographic examination of the colon and the radiographic appearances of metastatic bone disease. He has also been studying certain aspects of the radiographic appearances of the larynx, pharynx, and cervical esophagus. He has started an investigation on intraosseous venography where the major emphasis will be upon the delineation of the azygous and vertebral venous systems in an attempt to determine the operability in carcinoma of the lung. An investigation of bone trephine biopsy was carried out in cooperation with Dr. Wolfgang Ackerman. Dr. Doris Bate and Professor Ruth Guttmann are making a clinical study of radiation fibrosis of the lung following radiation therapy in carcinoma of the breast.

Professor Ruth J. Guttmann made an extensive clinical study of the effect of 2 million volt roentgen therapy on various malignant lesions of the upper abdomen and upon inoperable cancer of the lung. She also compared and contrasted the effects of 2 million volt x-ray therapy and 250,000 volt radiation for inoperable cancer of the breast. A comparison of conventional high voltage therapy, including vaginal cones, with supervoltage irradiation in respect to dose distribution and results in carcinoma of the cervix uteri was also carried out. She made a study of the effect of supervoltage irradiation in malignant lesions of the urinary bladder and on patients having lymphosarcoma and allied diseases.

Attempts were made in the radiotherapy department of the Francis Delafield Hospital to standardize the tumor dosage needed clinically to restrain

the growth of various regional cancers by the use of 2 MeV X rays and cobalt 60 radiation.

Of fourteen carcinomas of the lung thus treated and examined post mortem by Professor Edith E. Sproul, three failed to show any evidence of persisting cancer in the treated area. Marked palliation of cough, reduction of expectoration, bleeding, and pain, and perhaps some prolongation of life was obtained in the majority of 100 carcinomas of the lung investigated by Professor Guttman.

Dr. Anna Goldfeder made comparative studies on the biologic properties of two animal tumors indigenous to the same host, and investigated the influence of the time factor in radiation effects on biologic systems. She is continuing an attempt to establish a relationship between rate of growth, metabolic activity, and radiosensitivity of various types of tumors, and is carrying out experiments to establish sensitivity and metabolic activity of two types of tumors growing in parent hosts, i.e., in the hosts from which they originated.

Members of the department delivered fifty-four guest lectures throughout the country, contributed thirty-eight articles to scientific journals, and wrote chapters in several textbooks.

DEPARTMENT OF SURGERY

Professor GEORGE H. HUMPHREYS II, Executive Officer

Pressures to expand are continually making the problems of maintaining balance increasingly difficult. During the past year this has been a major concern.

On June 30, 1955, Professor Frank Lamont Meleney retired after over forty years of association with Columbia. He was in the vanguard of those who developed chemotherapeutic and antibiotic control of infection, and with Miss Balbina Johnson discovered and demonstrated the effectiveness of a new antibiotic which they named bacitracin. In his laboratory, now directed by Miss Johnson, many members of the resident staff were trained who have contributed greatly in this field. On retiring he moved to Coral Gables, Florida, where he continues in practice.

Also on June 30, 1955, Associate Professor Edward J. Donovan retired. He was a pioneer in the surgical treatment of congenital hypertrophic pyloric stenosis and made many contributions, especially in the field of congenital anomalies of the gastro-intestinal tract. A past president of the New York Surgical Society, Dr. Donovan was elected in 1955 as president of the New York Academy of Medicine.

Other members leaving the department were Dr. Whitney Woodruff and Professor Arnold Kremen. Dr. Woodruff resigned on May 15, 1956, to join

a practice group in Virginia, Minnesota. Professor Kremen resigned on June 30, 1955, to return to Minneapolis. His position has been taken by Professor Cushman Haagensen. At the same time Dr. Grant Sanger gave up his practice in Mt. Kisco in order to devote his full energies to the surgical service at the Francis Delafield Hospital.

On May 16, 1955, Dr. David Ju was appointed instructor. He completed his resident training in plastic surgery at Presbyterian Hospital on June 30, 1954. His special field is reconstructive surgery following radical operations for cancer of the head and neck.

On September 1, 1955, Dr. Daniel M. Shapiro was appointed instructor on completion of his residency training. Dr. Shapiro had initiated and carried on during the previous four years an intensive laboratory study of combination chemotherapy in cancer. On January 1, 1956, Dr. Arthur Voorhees was appointed instructor on completion of his residency. He has been closely associated in the laboratory with Professor Arthur Blakemore, where he originated and developed the now widely used method of substituting plastic cloth tubes for preserved grafts in replacing major arteries. On January 1, 1956, Dr. Shivaji Bhonslay was appointed instructor. On March 1, 1956, Dr. Carl Feind was appointed instructor on completion of his residency. He has carried out special studies of the routes of spread of cancer from lesions of the head and neck. With Dr. Ju, his interest in this field will close the gap both at Presbyterian and Delafield Hospitals left by the resignation of Professor Kremen.

Sabbatical leave was granted Professor Virginia Kneeland Frantz from July 1 to December 31, 1955. She used this period to carry forward her studies of thyroid cancer and to complete histopathological studies on the pancreas for a fascicle of an atlas on tumor pathology, published by the Armed Forces Institute of Pathology. She also completed a clinical pathological review of thyroiditis. On March 1, 1956, Professor Haagensen was granted a six months leave of absence during which he completed for publication his book on carcinoma of the breast. Following this he visited major clinics in Europe and, under the auspices of the United States Information Service, lectured in Lebanon, Syria and Iraq, a tour of duty similar to that followed by Professor Humphreys the previous year.

No major changes have occurred in the undergraduate teaching program. The two-month, fourth-year clerkship in affiliated hospitals has been increasingly effective under Professor Harold A. Zintel at St. Luke's Hospital, Professor Howard A. Patterson at Roosevelt Hospital, and Professor Monroe A. McIver at the Mary Imogene Bassett Hospital in Cooperstown. The new program under Professor Kenneth Lewis at Bellevue Hospital has proved promising and will be further strengthened in the coming year. In the third year, rearrangement of the schedule has permitted a more effective introduction to anesthesiology, but additional teaching time is urgently needed by this new and rapidly expanding discipline.

On the graduate level, the intern and resident training program has been modified according to plans inaugurated the previous year. The programs in the three hospitals are closely coordinated so as to provide as flexible a program as possible for each individual according to his interests and needs.

The research program has continued at a high level of productivity. On December 31, 1955, Professor David V. Habif, who had been in administrative charge of the laboratories, asked to be relieved of this assignment in order to devote more of his time to clinical teaching. His place has been taken by Professor Ralph A. Deterling, Jr. In this area, space restrictions in the face of wide availability of project support continue to be a major concern.

In the animal operation rooms the long-term studies begun in previous years by Professor Deterling, assisted by Dr. Bhonslay, on the fate of aortic grafts preserved by various methods is being concluded. As an outgrowth of this and the work of Dr. Voorhees, a study of a variety of synthetic fabrics has been conducted by the same investigators. The major effort in the cardiovascular field, however, has been devoted to the development of an apparatus for extracorporeal circulatory support along the lines of that developed and already in clinical use in Minneapolis. Working as fellows in this project were Dr. Felix Bacigolupo of Chile, Dr. Irwin Simandl of Vienna, and Dr. Julian C. Culton.

Professor Ferdinand F. McAllister and Dr. John F. Prudden are investigating new possibilities for revascularization of the heart following coronary occlusion; Dr. Frederick P. Herter and Professor Thomas V. Santulli are studying the influence of intestinal bacteria on the implantation of tumor cells at the site of intestinal anastomosis; Dr. Daniel M. Shapiro and Professor Habif are investigating a new resection technique for the treatment of ulcer.

Dr. Prudden, with Dr. John B. Price, Jr., continued his studies of growth hormone and insulin on protein synthesis in the liver. The enzymatic debridement of burns has continued under study by Professor Edward L. Howes in association with Dr. Ines Mandl. In addition, they have made interesting observations in the role of mucoproteins in wound healing and the body defenses against infection.

In the laboratory of surgical bacteriology, Miss Balbina Johnson has continued her studies of the efficacy of antibiotic combinations, especially neobacin, in preoperative sterilization of the alimentary tract and as a local antibiotic agent. In association with Professor Habif and Dr. Charles W. Findlay, Jr., an investigation of operative wound infections was carried out.

Professor Harold B. Barker has continued his studies in surgical physiology in the surgical metabolism research unit. Dr. Keith Reemtsma spent six months as a full-time fellow collaborating in these studies and Drs. Don O. Gore and Arnold Mittelman are spending twelve months. Drs. James R.

Malm and Roy H. Clauss actively joined in this work on a part-time basis while continuing clinical duties.

Professor Barker and Drs. Malm and Reemtsma have devised a new comparative fat and fatty acid intestinal absorption test utilizing radioiodine labeling. Drs. Mittelman and Gore have set up a steroid analysis laboratory within the surgical metabolism unit. The work, to more clearly define the operability of severe cirrhotics with ascites, has continued in collaboration with Professor Blakemore. Physiological studies, including steroid analyses, are being continued in these patients in an effort to better understand the forces which lead to ascites formation. In collaboration with Dr. Clauss, a study was completed on the rate of turnover of water and sodium in the pleural fluid of patients with pleural effusions. An investigation of hepatic coma has been continued and the technique for blood ammonia determinations has been improved.

The experimental program in the departmental laboratories in the Institute of Cancer Research constitute a substantial part of the research effort of the department. This is appropriate since, with the steadily decreasing need for surgical treatment of infection, the surgical care of the cancer victim has become the greatest clinical burden the department carries.

In the surgical pathology laboratory Professor Raffaele Lattes, in addition to supervising the routine diagnostic study of over 9,500 specimens, has made a special study of eighty cases of thymoma. With Professor Haagensen and Dr. Shelton Horsley he has reviewed eighty-six cases of Paget's disease of the breast. With Professor Nathan Lane and Dr. Malm a clinical-pathological study of malignant melanoma is in progress. Professor Lane has also collaborated with Professor Robert S. Grinnell in a study of adenomatous polyps and papillary adenomas of the rectum and colon. Dr. Carl Feind has continued his study of the metastatic spread of head and neck cancers by clearing techniques, and Dr. John Pickren, now chief of cancer research pathology at Roswell Park Memorial Institute in Buffalo, is continuing a similar study of lymphatic spread of cancer of the breast. Professor Frantz has studied the spread of thyroid cancer by similar methods, as a part of her over-all study of this disease. With Professors Kligerman and Quimby of the Department of Radiology and Dr. Mildred E. Phillips, she has studied thyroid carcinogenesis in the rat induced by radiation. Studies of thyroid diseases with I^{131} continue.

Professor Haagensen and Dr. Dan H. Moore have continued investigation of the milk agent in mouse mammary carcinoma. It is now possible to study the agent quantitatively. In collaboration with Dr. Ernest Pollard at Yale the cyclotron is being used in order to determine the size and nature of the infective agent. With Professor Margaret R. Murray and Dr. Etienne Lasfargues a method of growing adult mammary epithelium in quantity in continuous tissue culture has been developed.

The laboratory for cell physiology under Professor Murray has also

continued the detailed study of nerve cells in vitro in association with Dr. Arlene Deitch, Mrs. Edith Peterson, and Mrs. Helena Benitez. Dr. Stanley Crain has recorded action potentials from ganglion cells in vitro and is extending his study to human brain and sympathetic ganglia. Mrs. Ruth Eising, in collaboration with Professor Alfred Gellhorn, Professor Erich Hirschberg of the Department of Medicine, and members of the Department of Neurological Surgery, is studying the effects of chemotherapeutic agents on human brain tumors in vitro and clinically.

Dr. Daniel M. Shapiro together with Dr. Maurice Shils and Dr. Leroy S. Dietrich have continued their studies of combination chemotherapy based on quantitative study of biochemical differences between cancer and host tissues.

Professor Edmund N. Goodman and Dr. Henry Colcher of the Department of Medicine and their associates have continued their experimental and statistical investigation of the electrogastrogram in patients with gastric or duodenal abnormalities. Of special interest was the participation of Professor Goodman's group in a symposium on the electrogastrogram.

Professor Harold D. Harvey has continued his statistical evaluation of the postoperative results in patients suffering from carcinoma of the stomach.

On October 20, 1955, the department was host to the Connecticut Society of the American Board of Surgeons, presenting an operative clinic in the morning and a dry clinic in the afternoon.

The number of visitors from foreign countries has been greater than in any previous year. On April 5, 1956, Professor Helge Wulff of the University of Lund, Sweden, inaugurated the annual Sample lecture, which has been endowed through the generosity of Mrs. Jeanne E. Kerbs. On the following afternoon at the weekly cardiovascular conference he described the experiences with open-heart surgery in his clinic in Malmo. On May 24, 1956, Professor René Fontaine, Dean of the University of Strasbourg, France, spoke on experiences with surgical management of obliterative arterial disorders. In cooperation with the American College of Surgeons' program of assistance to selected visitors from the NATO countries through the Foreign Operations Administration, the department was visited by six surgeons from France, Spain, Portugal, and Denmark. This program is continuing with Professor Emeritus Allen O. Whipple as adviser. In addition we have had visitors for a month or longer from Brazil, Colombia, Mexico, and Guatemala. Two research fellows, Dr. Felix Bacigolupo of Chile and Dr. Irwin Simandl of Austria, have worked productively in the laboratory with Professor Deterling throughout the year.

The organization of a surgical society, bearing the name of Allen O. Whipple, was completed at Princeton on October 21 by a group of the residents he had trained while professor of surgery. His former residents seek to perpetuate his ideals and encourage their realization not only among those who come to the Columbia-Presbyterian Medical Center as members

of the surgical house staff but wherever surgical training is offered. Dr. Louis M. Rousselot was chosen the first president of the new society.

On February 24, 1956, a program was arranged by the resident staff to commemorate the tenth anniversary of the appointment of Professor Humphreys. The residents who had completed their surgical training during this period attended and took part in the program of laboratory demonstrations and short papers.

Members of the department published some sixty-seven papers; they attended numerous out-of-town meetings and presented many papers as well. In addition, Professors Frantz and Lawrence W. Sloan contributed chapters to a book on thyroid disease which was edited by Professor Sidney C. Werner of the Department of Medicine, and Professor Haagensen completed his book on diseases of the breast. Professor Humphreys in collaboration with Sturgis-Grant Productions produced a teaching film on anomalies of the aortic arch.

Professor Emeritus Allen O. Whipple received the first Evarts Graham Award for outstanding contributions to surgery and an honorary degree of Doctor of Science at the ninety-fourth commencement of Washington University in St. Louis. Professor Emeritus Arthur Purdy Stout was made an honorary fellow of the American College of Surgeons; he was also elected president of the Halsted Society, vice-president of the Intersociety Cytological Council, and secretary of the New York City Cancer Committee. Professor Humphreys was elected vice-president of the New York Surgical Society. Professor Lattes was appointed a consultant in surgical pathology to the Armed Forces Institute of Pathology in Washington. Professor Arthur Blakemore was elected president of the Society for Vascular Surgery at its tenth anniversary meeting in Chicago in June.

DEPARTMENT OF UROLOGY

Professor JOHN K. LATTIMER, Executive Officer

A gradual modification of the teaching of urology to the fourth-year class was begun during the year. Motion pictures demonstrating various urological operations, such as prostatectomy and nephrectomy, were shown as part of the curriculum. A library of lantern slides for use in teaching was started and small-scale clinical research problems were encouraged among the students. This policy resulted in the writing of several worthwhile clinical reports by fourth-year students. Additional demonstrations of clinical urological procedures were introduced into the course. The teaching of urological pathology to each student group was continued.

Promoted to the rank of associate clinical professor of urology were Drs. Charles T. Hazzard, Meyer M. Melicow, and Perry B. Hudson. Drs. Thomas J. Sullivan and Reginald Seidel were promoted to the rank of

associate. Drs. Timothy J. Donovan, Archie L. Dean, Jr., John E. Bowers, and Murray B. Pincus joined the department and were appointed assistants in urology.

Professor George W. Fish was re-elected treasurer of the Medical Society of the County of New York and reappointed senior civilian consultant in urology to the United States Army. Professor Fish is also the official representative of the American Urological Association with the Armed Forces, and is on the editorial board of the *Journal of Urology*. Professor John N. Robinson continued as a governor of the American College of Surgeons and on the executive committee of the American Urological Association.

Professor Emeritus George F. Cahill delivered a lecture on problems in the operative management of pheochromocytoma, before the annual meeting of the American Urological Association in Boston. Dr. Ralph C. Yeaw served as president of the New York section of the American Urological Association. Dr. Stanley Braham is on military leave and is serving with the Eleventh Airborne Division in Germany.

Urological pathology has continued to be developed in the department through the vigorous work of Professor Meyer M. Melicow. During the past year Professor Melicow published articles on the classification of tumors of the testis and another article entitled "Tumors of the Urinary Bladder: A Clinico-Pathological Analysis of 2500 Specimens and Biopsies," which was published in the *Journal of Urology*. In 1955, he presented an exhibit on pheochromocytoma before the American Medical Association meeting in Boston and again before the American Urological Association later in the year.

Cancer research in the department has been carried forward under Professor Perry B. Hudson. In this group are Drs. T. Duane Price, Michael E. Lombardo, and Morris London. Fourteen publications have appeared in various scientific and medical journals during the past year. Because of the importance of hormones in cancer of the breast and prostate, studies on testicular vein blood, adrenal vein blood, and peripheral vein blood are being carried out by chromatographic separation and identification. A study of calcium metabolism in mammary cancer patients was carried out in conjunction with Dr. Charles Crandall of the Department of Medicine.

Studies of the physical properties and the mechanism of denaturation of the prostatic acid phosphatase are continuing. Nucleic acid studies have continued. Radioactive tracer substances have been used to demonstrate the rate of renewal of phosphorus in intracellular small-molecule nucleotides.

The cancer research statistical group has continued to amass statistical data on the incidence of prostatic cancer in the aging male population, on the results of hormone-depleting operations and of other forms of therapy for prostatic and mammary cancer.

Research in microbiology, as applied to urology, was carried on by Professor Harry Seneca, who continued his researches into bacterial mutations

of *Micrococcus pyogenes aureus* which have been made penicillin-resistant.

Studies are also underway of the synergisms between antibiotics and antibiotics plus antibacterials. Studies were carried out on subhibitory concentrations of antibiotics on cultures of *E. histolyticus*.

Ultrasonic methods for destroying ureteral calculi are now under study in the department. This research is being conducted in conjunction with Dr. Harold Lamport of the Yale University Department of Physiology. Sufficient data have been gathered by Dr. Lamport to warrant animal experiments to evaluate the therapeutic and possible toxic effects of any ultrasonic devices for destroying calculi. Animal experimentation has been conducted during the year 1956 by Dr. Lamport, Professor Lattimer, and Drs. Truman Boyes and Murray B. Pincus. Dr. George Cvijanovich has assisted with this work, which has been conducted in the laboratories of the Department of Physiology.

A scientific exhibit demonstrating the dependability of the urinary catecholamine determinations as a diagnostic test for the tumor, pheochromocytoma, was shown in conjunction with Dr. Marcel Goldenberg of the Department of Medicine at the Boston meeting of the American Urological Association in May, 1956.

Dr. Ralph J. Veenema was placed in charge of the outpatient clinic and has organized a team for the study of renal calculi, which includes Dr. Kermit L. Pines and Professor Karl Meyer of the Department of Medicine. A tumor clinic has been initiated by Dr. Veenema, including Professor Morton M. Kligerman of the Department of Radiology, Professor Melicow, and other members of the department.

Research in pediatric urology has resulted in papers delivered by Professor Lattimer and Dr. Archie L. Dean before the American Urological Association and the New York Academy of Medicine. A new operative technique to replace the extrophied bladder back into the abdomen has been developed. Working in conjunction with the department, Professor James B. Campbell of the Department of Neurological Surgery has been able to restore bladder function in some children whose spinal cords were involved in scar tissue as a result of early operations on meningoceles. Professor Campbell's extensive research work on the neurophysiology of the bladder and his researches may well "re-write the book" on neurogenic bladder dysfunction.

A standardized Columbia University cystogram technique was described by Dr. Dean in a paper delivered before the New York Academy of Medicine in 1956. This work was also presented before the pediatric group of the American Urological Association in Boston by Professor Lattimer. Dr. Clement A. Furey presented research work done on the treatment of Peyronie's disease at the New York Academy of Medicine. Dr. Boyes summarized the results of chemotherapy for renal tuberculosis at the Presbyterian Hospital in a paper before the New York Academy of Medicine in

1956. Professor Lattimer addressed the annual meeting of the National Tuberculosis Association on this same subject.

As part of the Veterans' Administration cooperative study of the chemotherapy of tuberculosis, the department continued its interest in new methods of treatment.

MEDICAL LIBRARY

Professor THOMAS P. FLEMING, Medical Librarian

The present national emphasis on the use of audio-visual materials in teaching and research has a tendency to leave one with the impression that these were invented yesterday, whereas in reality such materials have been part and parcel of the teaching and research armamentarium in this University for many generations. In an effort to display our resources more adequately, we have gathered together into a special collection such non-book materials as lantern and kodachrome slides; punched cards; stereoscopic views and viewers; microfilms and film strips; models of various structures, such as the brain; various testing cards, such as Ishihara's plates for color blindness, and psychological tests, such as Rorschach's ink-blot tests; atlases consisting of superimposed plates and like materials.

In 1948 we projected and entered into a cooperative cataloging project with the Yale Medical Library and subsequently extended it to include the University of California at Los Angeles Medical Library. During the project's seven years of existence, Columbia has supplied to Yale and California one unit card per 5,782 titles for which Library of Congress cards or Armed Forces Medical Library cataloging were not available. In addition, by separate agreement Columbia and Yale supplied full analytic sets of cards to each other for a given group of thirty monographic serials. The decision to discontinue the preparation of monographic serial analytics was based largely upon the availability of analyses of the contents of the serials through improvement in international indexing and abstracting media.

A grant from the American Library Association made possible a catalog use study. Its purpose is to learn more about the use of library card catalogs by clientele and the problems which arise from their use. We were chosen as one of thirty libraries, only two of which were medical, to cooperate in assembling data; the findings may be expected to influence cataloging policies.

As a direct result of our continuous process of reexamining routines and services, we have eliminated the shelf record of bound volumes of back files of periodicals shelved in the balcony stacks of the periodical reading room on the fourth floor. While this has meant a little additional running up and down the stairs to consult the basic record on the third floor, the time ex-

pended and the inconvenience of this has been felt to be markedly less than the time expended in the maintenance of the record. We have also consolidated three separate serial file records (subscriptions, continuations, and binding records). Our personnel find that, in order to keep abreast of the routines necessary for efficient service with an ever increasing number of additional titles flowing into this library, it is necessary to continuously streamline operations.

In an effort to cooperate with the various Medical Center groups striving to promulgate an interest in the history of medicine, we have established a browsing collection of biographies and histories of medicine in the Bard Hall lounge. These are not an integral part of the Library's collection, but are duplicate copies which we choose to look upon as expendable. The library has also cooperated in preparing suitable exhibits and providing materials for lecture demonstrations in the field of the history of medicine.

Lectures on the use of the literature to various classes and orientation lectures to groups has continued as in the past. All schools and programs were covered. Special lectures to groups continued, and we have in process the preparation of sections of laboratory manuals for several departments. The Library continued to serve as a laboratory for the course in medical librarianship taught by Professor Fleming and attended by fourteen students.

At its fall meeting the Library Committee approved the establishment of a reprint table upon which to display for one month the current publications of the various departments of the entire Medical Center. This service has been placed in operation. The response on the part of the departments has been excellent and the use of the material has been most heartening. Too frequently members of one department do not know that another department is working in a closely allied field.

The Library Committee also unanimously endorsed a project of having a survey made of literature collections possessed by the various departments of the Faculty of Medicine; and the Planning Committee of the Presbyterian Hospital likewise endorsed a survey of the literature collections present in the various hospitals.

It is a pleasure to report the continued support of the Library by gifts and contributions from its many friends. During the year the library received an urn and pedestal presented by Mr. and Mrs. William L. Detmold, Jr., in memory of Dr. William L. Detmold, professor of clinical and military surgery, 1862-1865. We were also the recipients of the libraries of the late Drs. Edgar Grimm Miller, Jr., Kenneth B. Turner, and Charles C. Lieb. Dr. Jerome P. Webster, continuing his past generous gifts, gave funds for the purchase of publications in the field of plastic surgery.

The problem of space has now reached the stage of urgency. As predicted several years back, drastic steps have had to be taken. We have begun and partially completed the project of moving periodicals dated before 1900 to the Butler Library at 114th Street. The project was begun in February and

during the four months covered by this report forty-two volumes have been requested for use. This is in addition to the 448 monographs requested from our storage collection in South Property. The present system under which we find it necessary to provide literature for the various activities of the Medical Center is inefficient, uneconomical, and time-consuming for the library staff, to say nothing of the fact that at times we are an actual detriment to the smooth functioning of the teaching, research, and patient-care processes.

Kira Kalichevsky was appointed reference assistant. David Cone, cataloguer, resigned and was replaced by M. Evalyn Clough. Ruth Reed resigned as neurological library assistant and accepted the position of assistant in the surgical staff library. Emilienne Stordeur Lopat replaced Miss Reed. Erich Meyerhoff, medical reference librarian, completed all of his academic work toward the doctorate in library science. Harold Bloomquist, senior reference assistant, and Kira Kalichevsky continued their study for the doctorate. The professional members of the staff continued to play an active role in local and national library affairs by holding innumerable offices and committee appointments.

At the request of the State University of New York, Professor Fleming served as a special consultant to review future policies of the libraries of their College of Medicine in Brooklyn.

WILLARD C. RAPPLEYE, M.D.

Dean

June 30, 1956

COLUMBIA UNIVERSITY BULLETIN OF INFORMATION

Fifty-seventh Series, No. 42

October 19, 1957

Report of the Dean of the Faculty of Medicine

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1957



COLUMBIA-PRESBYTERIAN MEDICAL CENTER
168TH STREET AND BROADWAY
NEW YORK 32, NEW YORK

COLUMBIA UNIV. BULLETIN OF INFORMATION • SERIES 57 • NO. 42 • OCT. 19, 1957 • 1,900 COPIES

Issued at Columbia University, Morningside Heights, New York 27, N.Y., weekly from January for forty-six consecutive issues. Second-class mail privileges authorized at New York, N.Y., under the Act of August 24, 1912.

PRINTED FOR THE UNIVERSITY BY COLUMBIA UNIVERSITY PRESS

FACULTY OF MEDICINE

REPORT OF THE DEAN

FOR THE ACADEMIC YEAR ENDING JUNE 30, 1957

The registration of the School of Medicine was as follows:

First year	120
Second year	122
Third year	116
Fourth year	114
TOTAL	<u>472</u>

Residents from forty-six states, the District of Columbia, and thirty foreign countries, totaling 1,678 students from 322 colleges, applied for admission to the first-year class entering in September, 1957. The 120 accepted students received their liberal arts education in thirty-nine different colleges and came from twenty-one states and one foreign country.

The registration of the School of Dental and Oral Surgery was as follows:

First year	40
Second year	36
Third year	41
Fourth year	31
TOTAL	<u>148</u>

During the year there were sixty-nine students registered for non-credit postgraduate courses in the Dental School and forty-two students registered for postgraduate credit courses. A class of thirty-four students was enrolled in the Courses for Dental Hygienists; thirteen received the Bachelor of Science degree.

In the School of Public Health and Administrative Medicine the registration was as follows:

D.P.H. candidates	3
M.P.H. candidates	25
M.S. candidates	60
TOTAL	<u>88</u>

The registration in the Department of Nursing was as follows:

First year	131
Second year	118
Third year	113
TOTAL	<u>362</u>

During the past year there were 577 students from eighteen affiliated schools of nursing who received instruction under the Department of Nursing in various hospital and laboratory units of the Medical Center.

In the Course for Occupational Therapists forty students were registered, and in the Course for Physical Therapists, forty-seven students.

The following degrees were awarded during the year:

M.D.	114
Med.Sc.D.	1
D.D.S.	31
D.P.H.	2
M.P.H.	24
M.S. (Nursing and Public Health fields)	40
B.S. (Nursing, Occupational Therapy, Physical Therapy, Dental Hygiene)	142

In addition to the students enrolled under the Faculty of Medicine, there were approximately ninety students registered under the Graduate Faculties of the University who took courses and advanced research work in the departments of the Medical School.

The preceding figures indicate that the Faculty of Medicine is responsible for the instruction of many more students, graduate and undergraduate, than is commonly known. The total of medical, graduate, postgraduate, nursing, occupational therapy, physical therapy, dental, dental hygiene, and public health students, visiting scholars, fellows, hospital residents, and younger staff members runs to over three thousand full-time and part-time students.

It is gratifying to report that during the academic year 212 medical students received scholarships. Of these, twenty-eight were summer research scholarships.

It is with the greatest sorrow that we report the following deaths during the year:

Charles G. Barer, Instructor in Ophthalmology, on February 8, 1957

Rhoda W. Benham, Former Associate Professor of Dermatology, on January 17, 1957.

Samuel R. Detwiler, Professor of Anatomy and Executive Officer of the Department, on May 2, 1957

Henry S. Dunning, Professor Emeritus of Dentistry, on February 10, 1957

Haven Emerson, Professor Emeritus of Public Health Practice, on May 21, 1957

William J. Gies, Professor of Biochemistry, retired, on May 20, 1956

S. Philip Goodhart, Professor Emeritus of Clinical Neurology, on December 6, 1956

Ransom S. Hooker, Consultant, First Surgical Division, Bellevue Hospital, on April 11, 1957

Gwendolyn S. Jones, Instructor in Medicine, on December 30, 1956

Ewing C. McBeath, Professor Emeritus of Dentistry, on November 13, 1956

Leon A. Salmon, Assistant Professor of Clinical Neurology, on January 12, 1957

Benjamin Salzer, Associate in Anatomy, on November 12, 1956

Franklin A. Stevens, Associate in Medicine, on June 20, 1956

It is with deep sorrow that we record the death of Professor Samuel R. Detwiler, executive officer of the Department of Anatomy since 1927. No member of the faculty was more devoted to the interests of students, none was more liberal in time given to the problems of the school as a whole nor more generous in his cooperation with all departments. He was the last executive officer of the original group who launched the Medical Center. He will be greatly missed.

The following retirements, effective June 30, 1957, are reported:

Frank B. Berry, Professor of Clinical Surgery

Goodwin L. Foster, Professor of Biochemistry

C. Wadsworth Schwartz, Associate Professor of Clinical Radiology

The following emeritus designations were made by the Trustees:

Frank B. Berry, Professor Emeritus of Clinical Surgery, from July 1, 1957

Goodwin L. Foster, Professor Emeritus of Biochemistry, from July 1, 1957

The following promotions were made, effective July 1, 1957:

Howard A. Arden, Associate Professor of Dental and Oral Surgery

Harold G. Barker, Associate Professor of Clinical Surgery

Malcolm B. Carpenter, Associate Professor of Anatomy
Nicholas A. DiSalvo, Associate Professor of Dentistry
Zacharias Dische, Professor of Biochemistry
William A. Horwitz, Professor of Clinical Psychiatry
Beatrice M. Kesten, Associate Professor of Clinical Dermatology
John J. Lucca, Associate Professor of Dental and Oral Surgery
Thomas V. Santulli, Associate Professor of Clinical Surgery
Aura E. Severinghaus, Professor of Anatomy
Theodore H. Spaet, Associate Professor of Pathology
Melvin D. Yahr, Associate Professor of Clinical Neurology
Edward V. Zegarelli, Professor of Dental and Oral Surgery

The following new appointments were made:

Jack Elinson, Associate Professor of Administrative Medicine, from August 15, 1956
Hans Popper, Professor of Pathology (Mount Sinai), from December 1, 1956
Wilbur H. Sawyer, Associate Professor of Pharmacology, from July 1, 1957
Gilbert P. Smith, Associate Dean for Dental and Oral Surgery and Executive Officer of the Department of Dental and Oral Surgery, from November 1, 1956

The Janeway Prize, awarded to the graduate who, in the opinion of the faculty, has ranked highest in efficiency and ability, was given to Marcia K. Bilbao. The Borden Undergraduate Research Award was given to Robert Grossman for outstanding research work during the medical course. The Joseph Mather Smith Prize, awarded to the graduate whose essay or original research in medical subjects is deemed by the Committee on Award to be the most meritorious, was given to Dr. Elliott F. Osserman, Class of 1947. The Coakley Memorial Prize was awarded to Richard A. Chase. The Dr. Harold Lee Meierhof Memorial Prize in Pathology was given to Dwight W. Robinson. The Dr. William Perry Watson Prize in pediatrics was given to Henry Metzger. The Van Woert Scholarship Prize, the Ella Marie Ewell Certificate, and the Alpha Omega Fraternity Award were given to Joseph A. Di Cerbo. The Class of 1929 Award in Pedodontics, the Operative Division Prize, and the Rowe-Wiberg Medal were awarded to Victor S. Caronia. Linda Hilles was given the Frederick Parker Gay Memorial Award. The Joseph Garrison Parker Award was given to Charles A.

Bucknam. Arnold E. Max was given the Psi Omega Fraternity Award. The William Bailey Dunning Award for Excellence in Periodontology was given to Walter J. Rubinstein.

THE GRADUATE AND POSTGRADUATE PROGRAM

The graduate training program in the hospitals affiliated with the school, consisting of visiting fellowships, internships and residencies has continued with few changes. There have been eighty-six fellows registered for part or all of the last academic year; twenty-one of these came from thirteen foreign countries. In addition, numerous foreign visitors have been here for shorter periods of time. In the affiliated hospitals 546 interns and residents have received at least a large part of their instruction from members of our staff. The education of these physicians is, in general, closely correlated with their acquisition of clinical experience on an individual basis.

There has been a modest increase in the postgraduate program for practicing physicians. Five hundred and three physicians enrolled in sixty-two courses, designed to acquaint them with recent advances in the various fields of medicine.

In addition to the above intramural activities, members of the staff participated in many scientific meetings and educational programs throughout the country. These have ranged from public television programs to presentations of highly specialized advances to limited professional audiences. Members of the staff have been active on the editorial boards of numerous scientific journals. Many others have contributed to the literary phase of postgraduate education by reviewing manuscripts, preparing review articles and contributing to textbooks.

STUDENT HEALTH SERVICE

The Student Health Service, under the faithful direction of Dr. Albert R. Lamb, Jr., continues to meet the health needs of the students and employees of the Faculty of Medicine.

During the past year there were 398 routine physical examinations on students. Ten students were admitted to the admitting wards and twenty-two to the hospital. Routine chest X rays and routine dental examinations, including X rays, are available to the student body. Besides

providing routine health services, the Student Health Service continues to help students in other ways, such as rendering premarital examinations, completing insurance forms, and offering other similar services.

The Personnel Health Service, with Drs. Hans W. Neuberg and Arthur I. Snyder as physicians-in-charge, has performed 262 pre-employment physical examinations. In addition there have been 596 routine physical examinations, office visits, and the like.

FINANCING

The problems of financing the numerous activities of the Medical School proper, along with those of facilities for expansion, continue urgent. The generous aid from the Ford Foundation, the Commonwealth Fund, the National Fund for Medical Education, the American Medical Education Foundation, and the P&S Alumni Association has made it possible to continue the essential elements of the program without curtailment. This has been realized in large measure because of the dedication of the professional staff to the ideals of university medicine. The salaries of that staff still lag behind those in many other educational institutions, hospitals, industry, and governmental agencies. Last year only two members of the medical school instructional staff of over 1,000 persons received salaries of \$12,000 or more chargeable to the General Income of the University. Only five receiving \$10,000 or more were paid from that source. The others in those salary ranges were compensated entirely or in large part from endowment funds given for the purpose, from special funds, and from grants-in-aid. Those strictly full-time in certain clinical departments are included in this group. Their professional fees are turned into the University. Over 90 percent of the staff is on a part-time basis. Most receive no salary; a few are paid a small honorarium.

The nongovernment grants-in-aid of various types have increased from about \$200,000 in 1934-1935 to \$1,700,000 per year at present. The government grants and contracts (federal, state, and municipal) have risen in the same period from none to over \$2,600,000 annually. The total expenditures under the Faculty of Medicine represented by the Educational Schedule of the University budget have risen from about \$1,500,000 in 1930 to over \$7,600,000 the past year. The charges against

the General University Income are currently lower than they were a decade ago.

The more than five hundred grants-in-aid and contracts have been the chief source of support for most of the research programs of the school. The distribution of expenditures under the Faculty of Medicine is approximately as follows:

	<i>Percent of General University Income</i>	<i>Percent of Income of Special Endowments</i>	<i>Percent of Grants, Contracts, Hospital Reimbursements</i>
Medicine	16	10	74
Public Health	12	52	36
Dentistry	85	1	14
Nursing	38	1	61

MEDICAL EDUCATION IN THE CHANGING WORLD

Since the dawn of history there has been a thread of continuous effort in every society to cure the sick, treat the injured, advance knowledge of health, and train practitioners of the healing arts. Medical care in one form or another is today among the few universal, world-wide needs of mankind. Its future can only be assured through a program which will continue the production, education, and effective utilization of physicians and other professional health workers associated with them. Today such an objective is one of the primary responsibilities of any nation and must be closely related to other major activities of a modern society. The provision of adequate health services is one of America's most essential industries. It is one of the largest. It obviously requires a wide range of trained personnel, technical knowledge and skills, facilities, adequate financing, proper organization, good public relations, and all the other elements of a comprehensive community service.

Many of the problems which American medicine and medical education face must be considered in the broad context and perspective of current social, economic, political, and educational changes. Change and evolution are inevitable. Individuals, organizations, and educational programs must learn to adapt themselves to new and different conditions without, however, surrendering certain fundamental principles and obligations. In spite of all of the ferment and the impact of

many features beyond the control of the medical schools, the elements of sound health services and the preparation and dedication of the profession to its public responsibilities must be retained. Although medical education itself is only a relatively small part of the over-all complex, it is crucial because it is the source of supply of physicians and other professional workers as well as the base for the advancement of knowledge to meet the future health needs of the country.

THE CONTEXT OF MEDICINE

The magnitude of the forces that are related to those of the health services may be illustrated by the fact that Americans are spending thirty billion dollars a year on insurance of various kinds, including their lives, medical care, and material possessions. Premium payments last year amounted to over twenty-seven billion dollars, two and one-half times the total ten years ago. Nearly half this amount was spent on life insurance and annuities. The total outlay for health services, both governmental and private, was about seventeen billions, including all forms of professional fees, hospital charges, nursing, drugs, appliances, and other related items, of which the private expenditures were between eleven and twelve billion dollars. It is worthy of note, however, that the amount spent on medical education itself, the most essential aspect of this whole program, is less than one percent of the total of the private expenditures alone.

Among other features of our complex society which have an impact on the problems of medicine and medical education may be mentioned the industrialization of the country; the high rate of urbanization; the migration of the population (during the last twelve months thirty-three million people moved to new locations, the largest shift in history, mostly through the development of suburbs of the metropolitan areas and loss from the farm to the industrial states); new methods of communication and transportation; the aging of the population, which is accompanied by an increase in chronic diseases; the ever increasing complexity of scientific knowledge with necessary specialization; the rising costs of health care; the growth of prepayment insurance; the conducting of government largely by pressure groups; the increasing voice the government has in all of our daily activities; the emphasis on preventive medicine, mental disorders, chronic illness, rehabilitation;

and the extension of mass education. Yet the needs of the patient and his family in matters of health, sickness, and disability are still personal and individual.

These and other socioeconomic aspects of medicine and of medical education have been recognized by the profession for some time.

The widespread publicity and propaganda regarding the economic aspects of medical care have focused attention upon the present forms and costs, rather than upon a plan which will insure services of high quality. They have created the impression that the present cost of the care of the sick is unreasonably high. The total expenditures are a small fraction of the national income and insignificant when compared with the total values which the services aim to protect.

A competent and effective scheme is dependent upon a body of trained personnel who are abreast of current knowledge and skillful in its application. Any plan of organization, whether developed from within the profession or imposed upon it from without, which lessens the responsibility of the trained physician or denies him the rewards of superior ability and character will, in the long run, be detrimental to the public welfare. No scheme of organization or group responsibility can substitute for the priceless, discriminating, and sympathetic judgment of the competent and conscientious physician.

Inasmuch as the objectives of medical care can be attained only by trained personnel, the educational features become paramount, not only in the recruitment and training of students for the professional groups but also in the continuation education which will keep the members of these groups abreast of new knowledge and methods.

The preparation of students for the newer obligations and opportunities of the profession requires a sound training in the principles of the basic sciences, which are likely to remain the foundation of medical practice, research, preventive medicine, and public health work. The training should emphasize, however, that the forms and methods by which these principles are to be applied in meeting the needs of individuals and the community are likely to be modified in the future.*

The keystone in the arch of adequate health services is the physician. There is no substitute for him and the only source of supply is the medical schools. Hence, medical education must be the concern of every segment of our national economy.

* From the *Final Report of the Commission on Medical Education* (1932).

Medical education includes not only premedical preparation but also the subsequent continuance of the educational process throughout the internship, hospital residency, specialty training, and the continuation education of physicians in practice. All features of the entire program must contribute also to the obligation of physicians to participate in the preparation, supervision, and guidance of the army of nursing, dental, public health, and technical workers and lay employees of health institutions and organizations as well as in the education of the public in health matters. The medical schools occupy the central position in the guidance and development of adequate health services of every kind and description for the entire population. It is a heavy responsibility.

The supply of doctors is under constant discussion, to which reference was made in previous reports. Attention may be called to the fact that 7,463 physicians were added to the profession during the calendar year 1956 and 3,659 deaths were reported—a net increase of 3,804 doctors in the United States. It is vitally important to the future of the country that the recruitment and education of well-qualified students and physicians be maintained in order to insure adequate numbers for the future.

THE MEDICAL SCHOOL

The medical school is always greater than the total of its parts. Its existence is justified to the extent that it maintains excellence in performance—education, research, hospital responsibilities, and public service. The primary function of medical education is to create an environment in which well-qualified students may acquire the knowledge, habits of study, basic skills, sound attitudes, sense of personal responsibility for patients, and an understanding of the professional, community, and the ethical principles that motivate the true physician. Many of the features of practice, science, and community service cannot themselves be taught—they have to be learned under the guidance of a competent and enthusiastic faculty.

CHANGES IN MEDICAL EDUCATION

The rapidly moving developments are reflected in a changing philosophy of medical education. The new attitude is to regard it as a graduate discipline requiring integration of the entire learning process.

The whole undergraduate medical course must be looked upon as a unit, not as a series of independent and more or less watertight compartments. This is a characteristic that distinguishes medical instruction from most other divisions of the university. The objective of the medical course is to produce upon graduation neither a specialist nor a physician who can render every type of professional care but rather one who, after an internship, is prepared to begin practice as a well-rounded, competent, safe, and conscientious family physician or to go forward into advanced work in a limited field.

Another feature of our present-day educational plan is to select self-starting, self-directing, and self-propelling students who have a broad cultural background rather than a concentration in the sciences and who, under the guidance and supervision of skilled teachers, may secure the elements of a real education which, at the professional level, must always be largely self-education. In the instruction itself the emphasis is placed increasingly on the longitudinal nature of disease and the changes that occur in the individual throughout his entire life span rather than on the occasional acute illness or episode of disability.

NEW PLANS AND METHODS

Importance is increasingly being placed in the evaluation of the student upon his ability to think for himself; to demonstrate initiative, imagination, intellectual curiosity, scientific critique, and resourcefulness; to face alternatives and to make decisions; and to develop understanding of diseases and of people rather than knowledge of them alone. The reliance is being placed upon performance, judgment, discrimination, and intellectual self-reliance which reveal the intangibles and imponderables that mark the true physician.

While it is highly important that the purely intellectual talents of the student should be developed to the fullest, it is also vital that the qualities of temperament, human sympathy, and insight which are required for dealing with the manifold human problems of medical care should be emphasized. The physician needs an understanding of, and must be able to treat, the man as well as the disease. Probably no field of endeavor comes closer to the everyday problems of humanity than medicine.*

In view of the broadening concepts of professional education, new methods and plans of instruction have been introduced here and in

* From the *Final Report of the Commission on Medical Education* (1932).

other progressive schools. Many of them are really only modifications of old and tried methods, sometimes adopted on the assumption that if presented as being different, they may be better. Without doubt the merit and acclaim attached to most of the "new" plans and developments, themselves thoughtfully worked out, are attributable directly to the lively enthusiasm of the staff and a fresh concentration on teaching. The staff are stimulated, organized, and sometimes financed sufficiently to insure success of the program.

The Columbia Faculty of Medicine is alert to the newer methods and opportunities. In fact, it has introduced and for years has been using some of the sounder ideas that others are now promoting. It maintains its long-established practice of continuous appraisal of the instructional program through its Committee on Instruction, the Committee on Administration, and the Faculty itself. The problem is not so much of tinkering with the curriculum—an activity that has little or nothing to do with real education—but rather with the dynamics of learning and the intimate daily association of students with interested, devoted, and inspiring teachers.

Among the devices that may be mentioned and which are utilized in our teaching program are the group clinic; various forms of family medical care plans with which our students are made acquainted; direct supervision of students who are in the process of learning by doing under supervision; integration of the instruction of several different departments through interdepartmental committees and its periodic review by the respective class faculties; erasure of many of the traditional lines between disciplines, which leads to a far more closely integrated program than in the past; shifting of the focus of instruction from expounding by the teacher to learning by the student; emphasis on developing the student's powers of observation and critical faculties rather than merely training his memory; the growing attention to the problems of aging, chronic diseases, rehabilitation, mental disorders, and prevention; presentation of more comprehensive and fewer lectures; review of the basic sciences in the clinical years and, conversely, early introduction of the clinical concepts into the basic sciences; dependence upon individual supervision of students in ward and clinic teaching; correlation clinics throughout the medical course; demonstration and interpretation through the patient's medical history of the

social and economic aspects of his daily life (these factors contribute to the diagnosis, treatment, and follow-up of his illness) and particularly how he reacts and adapts himself to them; the effective supplementary teaching in affiliated community hospitals, municipal as well as voluntary; elective periods of research in which increasing numbers of students are participating; and careful scheduling, for greater effectiveness, of the time and efforts of students and faculty.

The widespread adoption of the clerkship plan of teaching in the clinical years well illustrates the effort to place the student in a position not so much to memorize and learn facts but quickly and confidently to mobilize the knowledge which he has accumulated. He is called upon to select, examine, and judge pertinent data of the patient's history, family environment, laboratory findings, and other features that contribute to the problem on hand in order that he may formulate a reasonable appraisal of the existing condition. Since no two patients are identical, it seems only reasonable to assume that the manner in which such a student conducts himself, the judgment that he shows, the resourcefulness and ingenuity which he may display in arriving at sound conclusions are procedures which can only be judged over a long period of observation and supervision. The evaluation is a constant process.

PROGRESSIVE METHODS AT P&S

The results of some of the progressive planning of the medical course may be illustrated as follows: The schedule in the clinical part of the course is on a twelve months' basis instead of an academic year. One twelfth of them are on vacation each month. This makes it possible to integrate fully the teaching schedules with the actual operation of the hospitals and clinics at the Medical Center and in affiliated institutions.

Under the arrangement, the third-year students register immediately upon completion of their second year. In effect, the student remains in constant session from the beginning of his second year until graduation, except for a one-month vacation each year. The total effect of this lengthening of instruction has been to provide about five academic in four calendar years. It has permitted the more leisurely study of many problems of medicine and longer student contacts with patients and their problems in the various clinics and clerkships. It has also given the student a real sense of responsibility very like the responsibility he

will later assume when he goes into hospital training or medical practice. It also has allowed him, under the system of electives, to set aside periods for research and investigation which are recognized as highly important tools of real education.

Rearrangements of the teaching schedule permit every student to obtain a three months' clerkship in internal medicine in the third year. This is designed to give the student maximum preparation for subsequent clerkships and presents the broad phases of medicine that are likely to be encountered later by a family physician.

Further simplification of the third-year training has been accomplished by adopting a similar scheme for pediatrics and surgery. These several devices have prepared the student to take full advantage of the long clerkships in the Medical Center and in selected services in affiliated hospitals where special opportunities are provided.

The fourth-year students participate in two months' clerkships at the Mary Imogene Bassett Hospital in Cooperstown, New York. In this plan the facilities of this community hospital, which is staffed by full-time physicians and laboratory workers, provide an unique opportunity for about half the students to participate in medical services for a rural population. The students live at the hospital and take part in the actual care of the sick and injured of the area. The hospital is the chief source of medical services for the entire local population. The experience covers every phase of medical care, including the problems met by families in their normal environment.

Other fourth-year clerkships are given in such hospitals as the Goldwater Memorial Hospital, where through the Research Division of the University, studies are conducted in the whole field of geriatrics. Students assigned there for two months have opportunities to study all of the chronic and degenerative diseases. The staff are full-time men devoting themselves to investigation and the instruction of students in the various disorders of late life.

The fourth-year clerkship at Bellevue Hospital places particular emphasis on the newer developments in cardio-respiratory physiology, particularly as it relates to people in late life. Special studies on pulmonary disorders that are closely related to cardiac conditions, either as cause or effect, are having special attention and support from substantial grants for facilities, equipment, and personnel.

Affiliated with the University is the Family Health Maintenance Program of Montefiore Hospital. Over several years the plan has been integrated with the prepayment insurance program of the Health Insurance Plan of Greater New York. Elective periods are provided for students to observe those activities.

The scheduling of the student's time permits him, if he wishes, to devote six months—the last period in the third year and the first period in the fourth year—completely to research. Some of the students in this group have gone to such places as New Guinea to do research in tropical medicine and to participate in the medical care of the local population.

The experiment of allowing outstanding fourth-year students to present lectures to the class has been highly successful and valuable. Discussions by members of the attending staff follow. Similarly, one of the monthly meetings of the Columbia-Presbyterian Medical Society is turned over and operated entirely by the students. This has been a most stimulating and exciting experience for the whole student body as well as the staff and has produced a number of highly favorable comments.

The further development of correlation clinics in the first year has been gratifying. Members of the basic science faculty and the clinical departments collaborate in presentation of the relations of these basic sciences and the medical problems which the student is likely to see later in individual patients. The social, environmental, occupational, and other phases of patient care are presented by members of the different staff groups dealing with those problems. Similarly, the members of the medical sciences participate in the fourth-year combined clinics.

Recently, one of the most helpful developments has been the integration of psychiatry into the four years of instruction. This has been brought about by the close cooperation of all of the clinical disciplines. The whole person and his manifold problems are considered, not just his specific medical or surgical needs at the time.

The plan has also been carried into the residency system of the Medical Center under which the residents in the New York State Psychiatric Institute are appointed initially in Presbyterian Hospital, where they work on the wards of general medicine, surgery, obstetrics, and pediatrics. They are then rotated through the services of the Psychiatric Institute and become available for consultation with residents on the

other services in the general hospitals. The results of this type of unified approach to the needs of the patient are gratifying.

In an attempt to strengthen the extracurricular activities of the medical students, a director of the social and cultural program has been added. A series of activities has been organized, largely by the students themselves, on the general theory that in order to be a fine doctor, it is necessary that the individual be a fine person. The morale and general attitude of the student body toward their medical responsibilities have been enhanced by the new program. It seems to be paying real dividends in the building up of an esprit de corps.

Special seminars and organized presentations on cancer, cardiovascular disorders, and other major phases of medicine and on the social and economic problems of patient care give the students a real understanding of comprehensive medicine. The emphasis again is on putting before the students the broad concepts of their responsibilities as physicians, not alone for the professional care of the sick but as community leaders and citizens.

The Group Clinic initiated years ago but still actively in use as a device for instruction and organization of the outpatient services is one of the most important innovations in this school and is a program which is being developed elsewhere. The plan is to admit to the Group Clinic all new patients without obvious or emergency illness. There each person is studied by a student who is assigned to the Clinic for two months. He takes a complete history, including social, economic, and personal data supplied, if necessary, by the social service investigator. A full work-up of laboratory and physical findings is done during the morning. In the early afternoon specialists from the various divisions of the Clinic consult with the internist and student on matters of diagnosis and treatment. Some of the patients are admitted to the hospital, others are referred to the departmental or special study clinics for further observation or treatment, and others are followed in the Group Clinic itself.

Between fifteen and twenty students are on service at any one time throughout the calendar year. The plan gives the student experience in his senior year in the operation of group practice of the highest order with special emphasis upon the key position of the internist or "family physician" in the scheme of medical practice and service.

PREPROFESSIONAL EDUCATION

The very nature and breadth of community and public as well as professional responsibilities which devolve upon the physician require sound, thorough and comprehensive preparation for the study of medicine. A true liberal education is an essential requirement for the physician of the future.

As stated in 1932, "the tendency of medical schools and regulatory bodies to define the range and character of premedical preparation is contrary to the spirit of real education, which should be general and not preprofessional in purpose. A sound general education is of more value to students of medicine than a narrow technical training in the premedical sciences."* It must stimulate an intellectual and spiritual life as a part of the permanent equipment of the individual, with a spirit and eagerness for learning.

Such an education is not merely that of cramming by students and memorizing of facts in order to teach them how to earn a living. The essential requirement is to help each student find himself as an individual and to provide the opportunities and stimulus for him to develop his own interests and ideas that will be enduring. What medicine and the community need are physicians who are broadly educated men and women rather than narrowly trained technicians and craftsmen. The preprofessional preparation should provide the student with an appreciation of his own as well as other cultures, and the historical record of man's achievements—social, intellectual and artistic—as well as an understanding of the physical and biological world. The most important objective may be knowledge of himself, his gifts, limitations, motivations and aspirations.

THE LENGTH OF PROFESSIONAL TRAINING

The question of adequate preparation in liberal education for the needs of medical education introduces the complex problem of the length of time required to produce a physician. This has been a frequent topic of discussion during the last three decades. Telescoping the professional and the undergraduate college courses was a common practice for years. The introduction of the longer hospital period of training

* From the *Final Report of the Commission on Medical Education* (1932).

plus the requirements of military service after graduation have intensified the challenge to reduce the long span of professional education. In the long run the most satisfactory solution may be not to interfere with the medical course per se, which is currently undergoing intensive revisions and improvements, but to strengthen and vitalize the period of secondary and college education.

The preparation for admission to professional studies is an essential part of medical education broadly conceived. It is gratifying to know that the efforts to strengthen the academic programs in the undergraduate colleges currently are producing results, although everyone is aware of the overwhelming prospects of excess student enrollments in the next decade. The emphasis is being placed upon deepening the intellectual experiences for upper classmen through honors programs, utilization of long vacations, and intensive instruction through new techniques and other devices. In its finest form the preprofessional liberal arts period, which in the colleges that provide the highest quality of instruction reaches its culmination in the last year, should give the student an opportunity to understand, appreciate, and share the cultural heritage of our civilization. To curtail that opportunity, which comes only once in a lifetime, and limit the college segment for physicians largely to an abbreviated contact with a true liberal arts preparation and a condensed curriculum in the basic sciences, supplemented by superficial acquaintance with a few social problems, may not serve the best purposes of the profession and, in the long run, of the nation.

Since most medical schools will probably continue to select the best qualified, most broadly educated, and mature students who apply to them for admission, any shortening of the time needed to produce a competent physician will of necessity be dependent in part on how the whole structure of secondary and college education is now being modified. It is the common experience that the superior students who would best be able to complete a shortened course are more likely to spend extra time during their professional course, and often are encouraged to do so.

COMMUNITY ASPECTS

The somewhat isolated, intensive, and scientific nature of medical education in the recent past is being rapidly changed because of universal recognition of the relationship of medicine in its social and public

context. Medicine has accepted, or had thrust upon it, community responsibilities of the broadest character. Medical instruction today recognizes and is attempting to deal with the social, economic, emotional, and environmental elements of illness and incapacity in individuals. These considerations need not and cannot substitute for a thorough grounding in the basic scientific disciplines, but they should supplement and vitalize that education because the future of medical practice, medical care, and public health is dependent in the long run upon progress and research in the basic sciences.

HOSPITAL RELATIONSHIPS

The medical school, as the chief source of practicing physicians, medical investigators, and teachers, has during recent decades become imbedded more or less formally in the structure of the university. At the moment, the pressure of economics, inflation, expanding hospital responsibilities, and other features, over which the medical schools and the parent universities have little control or the necessary resources to direct, are modifying the earlier concept of the strictly university medical school. The ability of hospitals, because of their flexible and more readily available sources of income, to meet the changing economic conditions and their responsibilities for the intern and residency training explain in part their increasing role in medical education and research.

Since the turn of the century the medical school has become intimately associated with the teaching hospital to which it has contributed enormously through the improvement of medical care. Many hospitals take the position that teaching and research costs should come from the university or private donors, often without recognition that the quality of the patient care in the institution is largely dependent upon the work and the presence of the research men and teachers.

It is on the wards and in the outpatient departments of the hospital that the medical student spends at least two of his four years and from one to five years of internship and residency preparation. The medical school, because it is the direct link between the teaching hospital and the community, must be much more than a training unit for physicians. The functions include the mobilization of the support of the resources of the university and of the modern hospital as they contribute in differ-

ent ways to the diagnosis and treatment of disease, the prevention of illness and disability, the advancement of knowledge of the basic and clinical sciences, and the guidance of individuals and the community in health matters.

RESEARCH

Research is the life blood of medical education. Efforts artificially to separate them or to divide the simultaneous responsibility of faculty members for both are unrealistic and illogical. If accomplished, the results in the long run would be detrimental to medical education. Separation is possible in noneducational governmental agencies, isolated research institutes, and industrial organizations but would interfere with the proper functions of a university school of medicine.

It is the responsibility of medical faculties to apply as fully and promptly as possible the potentials of the underlying biological and physical sciences and to convert such knowledge to its application to health problems. That this has been widely recognized by the public is evidenced by the many local and national voluntary agencies which through publicity and fund-raising efforts have built up support particularly for individual diseases and for specific projects.

These activities reflect the new and encouraging attitude on the part of the public as well as the profession. There has been a substantial increase from federal and state legislatures for research in the various medical and health fields which has contributed materially to the much needed support of teachers and investigators. These numerous efforts have played a vital part in the present world leadership of this country in medical education and investigation.

THE MEDICAL CENTER IDEA

The universities and the medical profession are the trustees of the essential knowledge which will contribute substantially to the solution of the problems of individual and national well-being, happiness and vigor. Possessing that knowledge, they are in a position to make, and are challenged by the responsibility of making, a vital contribution to the public welfare. In fact, they are doing so in many areas, not the least of which is the creation of the team concept of the medical center. The role of the medical center is in direct response to the obligations

of medicine and hospitals to meet conditions in this changing world. The center represents the mobilization of professional talents, research, and education in a combined assault on the health problems through providing the highest quality of diagnosis, treatment, and prevention of diseases and disability. It reaches its fullest measure of usefulness when adequately supported by the medical and allied professions, the community it serves, state and private financial resources for training, research and patient care and, above all, by the continued educational leadership of the university.

THE CHALLENGE

These broad considerations of the direction of development and challenge of medical education in the changing world have had a great deal of attention from our own faculty. Every effort is being made to implement and apply the latest concepts of medical responsibility. This grows out of the recognition that the crucial element is the individual student, upon whose character, attitude, preparation, ability, and industry so largely depend the results of his professional training.

The faculty has devised numerous methods for more closely integrating the instruction of the students as between the different basic sciences themselves and between separate clinical divisions, and above all, by correlating the entire program of the four years into a single plan. The aim is to develop in our students capability of appraising evidence and drawing conclusions based on logical reasoning, and to help provide a permanent intellectual equipment, resourcefulness, judgment, and proper habits as well as methods of study which will prepare the student to continue his own self-education throughout his professional life. The continuation education of the physician has been strongly emphasized as an essential element in a well-balanced medical service. These efforts are in the direction of individualizing instruction and providing opportunities for learning, for self-development and for independent work.

JOINT COMMITTEE ON THE FACILITIES OF THE MEDICAL CENTER

The Joint Committee of the Faculty and the Medical Board on the Facilities of the Medical Center, following the report, "The Staffing of

the Columbia-Presbyterian Medical Center," has gone forward in its studies of the immediate administrative and professional problems of the Medical Center. The three urgent pressures at the Medical Center are those of additional accommodations and opportunities for private practice for the part-time and geographic full-time members of the staff, more facilities for research and instruction, and adequate salaries from firm university sources for the full-time members of the teaching staff.

The Joint Committee on Facilities is attempting to visualize the future needs of the entire Medical Center. Among the urgent problems considered by the Committee are those of providing more satisfactory accommodations for the Doctors' Private Practice Offices, particularly in Presbyterian Hospital and Neurological Institute, and additional space for research both in the clinical services and in the basic science departments; improving the housing for intern and resident staffs; centralizing and making more effective the diagnostic laboratory units; providing for a modest unit for inpatient and office care of psychiatric patients; building a library-laboratory and an auditorium; improving the resources of the School of Public Health and Administrative Medicine; expanding, or perhaps building new, facilities for dental education and research; enlarging Vanderbilt Clinic; expanding and modernizing the animal quarters; providing more adequate service departments for the Hospital, including the laundry.

Every department of the School and service of the Hospital was consulted on their needs and estimates for the future. Each has supplied that information and it has been made a part of the study of the Committee. The most urgent features have been discussed and already acted upon. The rearrangement of the diagnostic laboratories has produced excellent results. It has been possible, through the cooperation of the Department of Anatomy, to create work space to take care of Neurological Surgery. The Departments of Urology and Surgery are working out plans for better integration of their diagnostic and investigative endeavors. Modest but important changes have been provided in Biochemistry, Pharmacology, and Physiology. These and other immediate needs are being met without extensive construction changes. The University has authorized the employment of architects to study again the library-laboratory addition and the possibility of placing an

auditorium on top of the present power plant. Plans are well advanced for the construction of improved animal quarters.

THE ADVISORY COMMITTEE ON PRIVATE PRACTICE

The Advisory Committee on Private Practice is devoting itself to a study of the whole problem of financial support for the clinical departments in the School. The continuing imbalance between the salaries available in the University for support of its clinical departments in contrast with the earning potentials in private practice has created a special problem in every medical school in the country. In this institution practically every variety and method of compensation of clinical teachers is employed, ranging from strict full-time appointments through geographic full-time and part-time arrangements. Consideration has been given several times in the last thirty-five years to various proposals for full-time group practice but thus far the policy of a broad flexible plan of appointment of the clinical staff has been retained.

THE FORD FOUNDATION GRANT

The medical school was indeed fortunate during the past year to receive a magnificent endowment grant from the Ford Foundation. This assistance, which supplements the earlier contribution from the Commonwealth Fund, has made it possible to continue the School's academic program, which would otherwise have been seriously jeopardized by the necessity of increasing salaries and meeting ever rising costs. The income from this endowment fund, as provided for in the grant, will be used to maintain and strengthen the instructional program, particularly in the basic medical sciences.

ALUMNI ACTIVITIES

During the past year the P&S Alumni Association office has been transferred to the Medical School. Beginning July 1, 1957, it will be administered through the Dean's Office in cooperation with the officers of the Alumni Council of the Association.

It is gratifying indeed that the alumni are taking increased interest in the affairs of the School and that the closer cooperation between the Association and the Faculty will be of great mutual advantage through

the development of more scientific programs, the inauguration of local clubs throughout the country, the organization of the alumni by classes, and other devices that will bring the alumni and the School closer together.

DEPARTMENT OF ANATOMY

Professor SAMUEL R. DETWILER, Executive Officer*

The department takes pleasure in recording the following promotions: Dr. Malcolm B. Carpenter from assistant professor to associate professor, Dr. Harry H. Shapiro from assistant professor to associate clinical professor, and Dr. George D. Pappas from associate to assistant professor.

Throughout the year, ninety-two residents from the affiliated hospitals have registered for various courses in the department. The course for residents in orthopedic surgery has undergone considerable shortening and modification, and will be given twice a year instead of once. Professor Emanuel B. Kaplan plays an important role in this course.

Our research potential has been greatly expanded this year by the addition of a laboratory for electron microscopy. This work will be carried out by Professor George D. Pappas who has been appointed assistant professor of anatomy, assigned to ophthalmology. He comes to us after four years' experience in electron microscopy at the Rockefeller Institute, New York, with Dr. Keith Porter, and the Department of Pathology with Professor Lewis Thomas, at New York University. Fifty percent of the research in the new electron microscopy laboratory will be devoted to ocular problems. Other investigations will be in the cardiovascular field, of interest to Professor Copenhagen. In addition to his research duties, Professor Pappas will be one of the teaching staff in microscopic anatomy.

Professor Wilfred M. Copenhagen has continued his studies on the correlation of cardiac structure and function during embryonic development. As a part of this program, a paper in collaboration with Dr. William G. Cooper of the University of Colorado School of Medicine has been published on the distribution of succinic dehydrogenase within different chambers of the heart of larval amphibians.

In collaboration with Dr. Keith Reemstma of the Department of Surgery, a paper has been completed on the location of the atrioventricular bundle in a variety of human congenital heart anomalies.

The histochemical research of Professor Herbert Elftman has centered on the endocrine glands and their target organs. The interactions between the pituitary gland and the steroid hormones of the ovary have been studied during the normal cycle and with experimental hormone administration.

* Deceased May 2, 1957.

Observations made during a survey of phospholipid distribution in tissues have led to preliminary experiments on the part played by phospholipid-rich cells in the development of pulmonary tumors in mice.

Professor Edmund Applebaum is collaborating with Professor Roberts Rugh of the Department of Radiology on the effects of high doses of radiation on the teeth and jaws of rats and mice.

Professor Harry H. Shapiro, in collaboration with Professor Dorothy D. Johnson, has completed the first part of an experimental investigation of transplanted tooth buds in the rat, and are continuing the second part of the study. Professor Shapiro is also editing the second edition of the text "Surgical Treatment of Facial Injuries" by Kazanjian and Converse.

Professor Melvin L. Moss is continuing his research upon the process of normal and abnormal development of the skeletal system in general and of the skull in particular. The relationship of the skull base and dura mater in a variety of congenital and induced human cephalic malformations continues to be investigated. The analysis of skeletal and cephalic malformations in rats produced by a variety of teratogenic agents continues.

Dr. Moss has also begun a study of bone repair and bone induction. In conjunction with the Division of Orthodontics, studies are being continued on the mesial migration of teeth and the effects of spreading the median palatal suture.

Professor Malcolm B. Carpenter has continued his research on a study of isolated lesions of the fastigial nuclei in the cat and monkey. Other research projects completed during the year are concerned with the functional relationship between the deep cerebellar nuclei and the brachium conjunctivum, the rubrospinal tract in the rhesus monkey, the relationship between the brachium conjunctivum and the red nucleus, and an applied study of the globus pallidus in reference to some of the newer neurological approaches to paralysis agitans.

Professor George K. Smelser has continued his research along four main lines: the embryology of the eye, exophthalmos, healing of corneal wounds, and the turnover of sulphate in connective tissues. Experiments on the distribution of radioactive sulphate in the developing eye have been completed. He has also carried on investigations of the healing of incisions in devitalized corneas produced by freezing and compared with those which were made in normal corneal tissue. In conjunction with Professor Copenhaver, a rather extensive radioautographic investigation of the metabolism of connective tissue has been carried out. Rabbits were injected with radioactive inorganic sulphate, which becomes incorporated in the sulphated mucopolysaccharides of connective tissue. Following various periods radioautographs were prepared of many types of connective tissues.

Professor Margaret R. Murray's tissue culture laboratory has been both busy and crowded. Two visiting fellows have been added to the working group: Dr. F. Thomas Algard of Stanford University has been investigating

the histogenesis of two hormone-dependent tumors of the hamster; and Dr. Murray Bornstein of Mount Sinai Hospital has been developing methods of cultivating CNS tissues for experimental study of the demyelinating diseases. The work of Mrs. Edith Peterson on the factors governing the development of the dorsal root ganglionic complex is noteworthy. Important also is the work of Mrs. Helena B. Benitez upon the cytodifferentiation of adult rat fibroblasts. Dr. Etienne Y. Lasfargues has been studying the lipid inclusions in the secreting epithelium.

Professor Charles A. Ely has furthered his studies dealing with the effect of antigonadotrophic serum on experimentally produced ovarian tumors. In addition, studies of the properties and nature of antigonadotrophic sera are being conducted.

Professor William Rogers and Dr. Erwin Simandl from Vienna, in collaboration with Professor Ralph A. Deterling, Jr., of the Department of Surgery, are continuing their studies on heart sounds and murmurs by employing direct heart recordings in animal experiments.

By means of deafferentation experiments Professor Rogers is investigating the role the receptor mechanisms play in so-called voluntary motor control. He is also continuing his study of muscle atrophy and hypertrophy utilizing electromyographic and microscopic techniques. Associated with him are Dr. Russel Vanaeck and Dr. Richard Udall of the Division of Orthodontics, who are utilizing electromyograms for evaluation of certain orthodontic procedures. Continuing his work under Professor Rogers, Mr. Robert Rhodes, a fourth-year dental student, has completed his experiments with subperiosteal implants of mandibular dentures of various alloys.

Professor Charles R. Noback has been analyzing the cytoarchitecture of the brain stem of the gorilla as part of a project on cytoarchitectonics of the primate brain stem. With Professor James B. Campbell of the Department of Neurological Surgery and Dr. Andrew L. Bassett of the Department of Orthopedic Surgery, studies on the regeneration of nerve fibers have been conducted. A longitudinal study of the hand of human adolescents has been conducted with Professor Melvin L. Moss.

Professor Frederic J. Agate, Jr., is continuing his studies on endocrine factors involved in resistance to low temperature in experimental animals. With Professor William A. Silverman of the Department of Pediatrics, he is continuing his study of temperature variations in premature infants. They are also developing methods for precise control of body temperature in premature infants. Together with Professor Seymour Lieberman of the Department of Obstetrics and Gynecology and Professors Bernard F. Erlanger and Sam M. Beiser of the Department of Microbiology, they are continuing their investigations of protein-conjugated steroids.

Professor Detwiler has done new experimental studies on the shoulder girdle of amblystoma and, in collaboration with his assistant, Mrs. Rhoda van Dyke, further experimental studies on the development of the ear are in

progress. He and Professor Copenhagen have been collaborating also on a study of propylthiouracil-induced tumors in amblystoma. These data will be ready for publication during 1957-1958.

DEPARTMENT OF ANESTHESIOLOGY

Professor EMANUEL M. PAPPER, Executive Officer

During the academic year Professor Johannes Bartels resigned to accept the position of associate professor of anesthesiology at New York University. Welcome additions to the department during this period were Dr. Seamus Lynch, who had completed military service, and Dr. Albert Levy, who joined us after a special postresidency training program in anesthesia for thoracic surgery at the University of Wisconsin. The addition of these two men has been of the greatest benefit to the department.

Previous reports to the Dean of the Faculty of Medicine described the efforts to improve instruction to medical students in anesthesiology. The real possibility of modernizing teaching in anesthesiology clearly exists as part of the reorganization of teaching activities. The basic sciences of pharmacology, physiology, chemistry, biophysics, and anatomy are important aids for research and education, and as bases for proper clinical practices in anesthesiology.

Graduate education continues in the manner of previous years. In addition to the effective program of the residency, the department has engaged in the training of research fellows to a greater degree than in previous years. Dr. Robert M. Epstein, a fellow of the New York Heart Association, has been assigned to the Department of Medicine under the immediate direction of Professor Stanley E. Bradley. Dr. Troy H. Thrower, upon the completion of his residency, will, as a fellow of the New York Heart Association, work under the direction of Professor M. Jack Frumin of this department. Dr. Christen C. Rattenborg of the Bispebjerg Hospital in Denmark has engaged in research activities under the direction of Professor Duncan A. Holaday.

The department has continued its usual activities in the presentation of scientific papers to a variety of professional and scientific societies. Eighty-one papers have been presented outside of our own institution and twenty-six papers published or in press. A textbook designed for the use of medical students and beginners in residency training was prepared by Professors Herman Schwartz, Shih Hsun Ngai, and Emanuel M. Papper, and published by Charles Thomas. A monograph of the proceedings of a conference concerned with the physiology of the myoneural junction was published during the year and edited by Dr. E. J. deBeer of Burroughs Wellcome and Company (U.S.A.), Incorporated, and Professor Papper.

The department was host this year to a conference in the special field of neonatal physiology. Experts in this field representing physiology, obstetrics,

pediatrics, and anesthesiology attended the conference as the guests of Professor Virginia Apgar and the department.

The department continued to conduct its educational activities for foreign visitors sponsored by the International Cooperation Administration under the auspices of the American College of Surgeons. This year anesthesiologists from France, Luxembourg, and Italy were sent to us.

As in previous years, the department was fortunate in having visitors of prominence from the United States and abroad. Among the distinguished foreign visitors were Professor William W. Mushin of the Welsh National School of Medicine; Dr. Ronald Woolmer, the Director of the Faculty of Anaesthetists of the Royal College of Surgeons in London; and Dr. B. G. B. Lucas, Consultant Anaesthetist, University College Hospital, London.

Professor Jean Henley, who is assigned to the Francis Delafield Hospital, spent three weeks in the autumn of 1956 with a group of physicians from the countries behind the Iron Curtain who were in the United States attending various conferences. Professor Henley was greatly impressed by the advances in anesthesiology in West Germany since her last teaching activities in that country in 1950.

Professor M. Jack Frumin and Mr. Arnold S. Lee, an engineer, have begun work on the construction of a new type of anesthetic apparatus which is based upon the principle of producing definite measured concentrations of volatile anesthetics in diluent gases. Professor Frumin also joined the group of investigators under the direction of Professor Stanley E. Bradley of the Department of Medicine in their study of the effect during general anesthesia of induced respiratory acidosis on splanchnic blood flow and volume.

Dr. Robert M. Epstein, a fellow of the New York Heart Association assigned to the Department of Medicine from Anesthesiology, was also an active member of this group. In addition, he carried on a study of shock.

Under the direction of Professor Bradley, he engaged in studies on the mechanisms of hepatic bromsulphalein uptake and in studies on the development of a technique for the measurement of kidney mass using renal vein catheterizations and regional antipyrine distribution. When Dr. Epstein rejoins the department in July, 1957, it is expected that this working relationship with Professor Bradley will continue.

Professor Frumin collaborated in studies with Professor Dominick Purpura of the Department of Neurological Surgery on the effect of nitrous oxide on evoked potentials in the dendrites of both human and cat cerebral cortex.

Professor B. Raymond Fink, in collaboration with Professor Duncan A. Holaday and Dr. Christen C. Rattenborg, engaged in studies on the physiological control of accessory respiratory muscles. The conditions in these studies parallel those present in the newborn and may serve better to understand the genesis of breathing at birth as well as to suggest possible methods

of more effective treatment when the first breath and subsequent respiration at birth are abnormal. Working with Dr. F. Kirschner of the General Electric Acoustics Laboratories, Professor Fink extended his radiographic analyses of laryngeal mechanisms to a study of phonation. In collaboration with Professor John J. Conley of the Department of Otolaryngology, he also began a radiographic study of the defective swallowing mechanism which occurs after radical resections of certain types of oral carcinoma.

Professor Lester C. Mark and Dr. Leonard Brand have continued their studies on the intravenous anesthetic agents in collaboration with Drs. Bernard Brodie, John Burns, and Peter Dayton of the National Heart Institute. The studies of Professor Mark and Dr. Brand on brain penetration with oxy-thiobarbiturate analogues have been completed.

Professor Edgar C. Hanks has continued his studies of the causes of death during and after anesthesia in collaboration with Dr. Vance Lauderdale, Jr.

Professor Duncan A. Holaday has spent much time and effort on the development of appropriate instruments for the performance of studies in the laboratory and the operating room. Together with Dr. Christen C. Rattenborg, Professor Holaday has developed a constant-flow respirator for the purpose of monitoring changes in airway resistance and compliance during controlled respiration in the anesthetized patient. Professor Holaday has also engaged in studies on the usefulness of the Nahas spectrophotometric method and the oximeter for determination of oxygen saturation of blood. Comparisons were made with analyses performed on the Kopp-Natelson microgasometer.

Professor Holaday's studies of the effects of artificial respiration on the mechanics of breathing and upon the circulation have included measurements of blood arterial saturation, the development of a constant-flow respirator, and further efforts to make practical a method for serial determinations of cardiac output during anesthesia. Professor Holaday and Dr. Hubert Rosomoff of the Department of Neurological Surgery have resumed their collaborative efforts in the study of hypothermia.

Professor Holaday, Professor Ralph A. Deterling, Jr., and Dr. Shivaji Bhonslay of the Department of Surgery have continued their studies on acid-base disturbances during extracorporeal circulation. Professor Holaday was appointed Conference Chairman for the Tenth Annual Conference on Electrical Techniques in Medicine and Biology to be held under the sponsorship of the Instrument Society of America.

In addition to the work in respiration associated with Professor Holaday's research program, Dr. Christen C. Rattenborg and Dr. Seamus Lynch have extended these studies on respirators to examine expiratory patterns in the negative phase of positive-negative respiration.

Professor Virginia Apgar has continued her studies of the neonatal period in collaboration with Professor Holaday, Dr. Edward Prince of the De-

partment of Obstetrics and Gynecology, and Drs. L. Stanley James and Irwin Weisbrodt of the Department of Pediatrics assigned to the Department of Anesthesiology. More than sixty infants have been studied thus far with respect to hemodynamic changes at birth and changes in acid-base balance associated with the birth process. Professor Apgar has begun her follow-up of children who had heel blood measurements at birth ten years ago. She has been assisted in these studies by members of the Departments of Neurology, Psychiatry, and Otolaryngology.

Professor M. Jack Frumin and Dr. Norman Bergman have continued their studies on the effects of altered expiratory resistance and pressures on arterial oxygen saturation during artificial respiration. With Professor Herbert Rackow and Dr. Bergman, Professor Frumin has studied the effect of anesthetic agents upon the determination of carbon dioxide by infrared spectroscopy. Professor Herbert Rackow and Dr. Ernest Salanitro have continued their studies on acidosis in collaboration with Professor Holaday.

Professor Herman Schwartz has continued his study of the effect of succinylcholine on intraocular pressure in man with Dr. Andrew DeRoeth, Jr., of the Department of Ophthalmology. Professor Schwartz has also studied the new inhalation agent fluothane, which is of considerable interest because it is potent and noninflammable. Nine adults and approximately forty children have been anesthetized with it.

Dr. Marilyn M. Kritchman has continued her studies of anesthetized patients with familial dysautonomia. This is a syndrome first described by Professors Conrad Riley and Richard Day of the Department of Pediatrics.

Dr. Rita Jacobs has concluded her studies on a series of topical anesthetic agents. She has also reviewed the records for newborn patients who underwent surgery for esophageal atresia or tracheo-esophageal fistula from 1950 to 1956.

Dr. Albert Levy has engaged in the study of a new narcotic, dipipanone hydrochloride. He is also engaged in a study of the postoperative course of patients who have been anesthetized for thoracic surgery with the special Carlen's tube.

DEPARTMENT OF BIOCHEMISTRY

Professor DAVID RITTENBERG, Executive Officer

Professor Hans T. Clarke, who was Executive Officer of the Department from 1928 to 1956, retired. During this period, while the field of biochemistry was undergoing a tremendous expansion, he guided the department to a position of eminence. He is continuing his scientific investigations at Yale University.

Instruction in biochemistry has been given to first-year medical and dental classes and to twenty-six students under the Graduate Faculties, of whom

eight have been carrying on graduate studies at an advanced level towards the Ph.D. degree in biochemistry and eighteen received instruction at an elementary level. Of these last, ten had their major interest in biochemistry and eight in other departments of this college. Courses in biochemistry in the School of General Studies were given by Professors Erwin Chargaff and David Shemin.

Almost all persons who hold academic appointments in the department have taken part in the instruction of medical and dental students. This has not resulted in a diminution of their research activities.

Professor David Rittenberg has initiated an investigation of the mechanism of active transport of glucose and some amino acids in isolated cells.

Professor Erwin Chargaff and his group continued their studies on the chemistry of nucleic acids and nucleoproteins and with the mucolipids of brain tissue. Three postdoctoral research fellows took part in this work: Dr. Anna Lombard from the University of Torino, Italy, Boese Postdoctoral Fellow, Columbia University; Dr. Toru Tsumita of the University of Tokyo, Japan, Rockefeller Foundation Fellow; and Dr. Jack Horowitz of Indiana University, National Science Foundation Fellow. In addition, two senior collaborators, Drs. Harold Shigeura and George Brawerman, several graduate students, two of whom received their Ph.D. degrees this year (Drs. H. Shapiro and A. Rosenberg), and research assistants took part in the work.

Professor Zacharias Dische and his collaborators continued their study of the conversion of ribose-5-phosphate and hexose-6-phosphate in human blood hemolysates and in cardiac muscle under normal and pathological conditions. An investigation by means of proteolytic enzymes, of the nature of the carbohydrate protein bond in a neutral mucoid prepared from human plasma was carried out.

Professor Samuel Graff has continued to direct the Biochemistry Division of the Francis Delafield Hospital and has engaged in a comprehensive program of cancer research with emphasis on the energetics of growth processes. Professors Graff, Max Eisenberg, and Horace Gillespie, Drs. Aaron Freedman, Kathe Liedke, and Victor Ross, Mrs. Ada Graff, and Messrs. Kenneth McCarty and Francis Spano participated in the several varied attacks on the problem. The collaboration with Professors Alvan L. Barach and Hylan A. Bickerman of the Department of Medicine on experimental hypoxia therapy of cancer continued to be fruitful.

Professor Maxwell Karshan initiated a study on the amylase activity and chloride content of saliva in relation to dental caries. Dr. Alvin Krasna has continued his studies on the enzyme hydrogenase. Professor Barbara W. Low and her associates, Drs. Peter R. Pinock, Stewart McGavin, and Wolfe Traub, have set up an x-ray crystallographic laboratory and are continuing the study of the crystal structure of insulin.

Professor David Shemin has continued his studies on the biosynthesis

of porphyrins and related compounds, including vitamin B₁₂. He spent the summer under a Guggenheim Fellowship learning the microbiological and mutant techniques. He has given the William Albert Noyes Lecture at the University of Illinois this year and has edited Volume V of *Biochemical Preparations*.

Professor David B. Sprinson has continued his study of the cyclization to 5-dehydroquinic acid of the alpha-keto-beta-deoxyphosphoheptonic acid enzymatically derived from triose and tetrose phosphates in an attempt to isolate any intermediary stages. He has also continued his synthetic studies of folic acid derivatives related to the biosynthesis of methyl groups.

Professor Stephen Zamenhof has continued his studies on incorporation of unnatural pyrimidines into deoxyribonucleic acids and has demonstrated its effects on the ultraviolet resistance and genetics of the cell. He has also continued his studies on the transforming principle, in collaboration with Professor Hattie E. Alexander of the Department of Pediatrics.

Sixteen visiting lecturers have contributed to the seminar program: Professor H. H. Ussing of the University of Copenhagen; Drs. M. B. Hoagland and L. L. Engel of Massachusetts General Hospital; Dr. A. Mazur of the College of the City of New York; Dr. Cyrus Levinthal of the University of Michigan; Dr. Michael Heidelberger of Rutgers University; Dr. Michael Sela of the National Institutes of Health; Dr. Herbert Anker of the University of Chicago; Dr. G. W. E. Plaut of New York University; Dr. Jacques Monod of the Institut Pasteur, Paris; Dr. Robert A. Alberty of the University of Wisconsin; Mr. N. W. Pirie of Rothamsted Experimental Station, England; Dr. Andrew Benson of the State University of Pennsylvania; Dr. Luigi Gorini of New York University; Dr. Henry Hoberman of Albert Einstein College of Medicine; and Dr. Nobuo Tamiya of Tokyo University.

DEPARTMENT OF DENTAL AND ORAL SURGERY

Professor GILBERT P. SMITH, Executive Officer

Associate Dean Maurice J. Hickey resigned as executive officer of the Department of Dental and Oral Surgery effective November 1, 1956. Dean Hickey, after twenty-four years of association with the Columbia-Presbyterian Medical Center, left to assume the duties as dean of the School of Dentistry of the University of Washington. The rearranged curriculum established under his direction was put in effect at the beginning of the academic year and has been conducted successfully for the freshman class. The sophomore, junior, and senior classes continued under the old curriculum.

The Admissions Committee, under the chairmanship of Professor Joseph A. Cuttita, selected from 280 applicants a class of forty students to enter

this coming September. The number of applicants is on the decrease. This decrease may be due to the increased interest manifested in engineering, physics and atomic energy; to the presence of two new dental schools in the metropolitan area; to the mounting costs of dental education—tuition, instruments, room, and board—and to a lack of proper living accommodations in convenient relation to the Dental School. The costs and the lack of accommodations especially seem responsible for the small number of applications from out-of-town students. The Committee thinks another reason may be the high standards set by our school, but they believe that by setting these standards our student body is superior.

DENTAL CLINIC

During the twelve-month period from May 1, 1956, to April 30, 1957, 6,332 patients made a total of 13,859 visits to the diagnosis clinic. Of this number 4,754 were new patients and 1,578 were former patients readmitted. There were 1,870 patients referred from the hospitals of the Medical Center, 394 teachers and students from Columbia University, 448 Medical Center or Columbia University personnel, and 3,620 from other sources. The total visits for all clinics, including diagnosis, was 60,059.

The operative dentistry clinic completed 2,836 procedures, an increase of 76. The prosthetic clinic completed 304 full dentures, 75 removable partial dentures, and 1,063 units of crown and bridgework.

DIVISION OF CLINICAL ORAL PHYSIOLOGY

Under the direction of Professor Laszlo Schwartz, the division is continuing in its temporomandibular joint clinic, an investigation of disorders of the temporomandibular joint. A book describing the results of the research of the past eight years is in preparation. Chapters have been contributed by Dr. Lewis J. Doshay, of the Department of Neurology, Dr. Albert W. Grokoe of the Department of Medicine, Professor Ruth E. Moulton of the Department of Psychiatry, Professor Melvin Moss of the Department of Anatomy, Professor John E. Scarff of the Department of Neurological Surgery, and Professor Jules Waltner of the Department of Otolaryngology.

The activities of the division—graduate and undergraduate teaching, service, and research—have been extended during the year by the appointment of Dr. Paul Addison and Dr. Issacher Yavelow to the staff.

DIVISION OF DENTAL HYGIENE

The Courses for Dental Hygienists were directed by Professor Frances A. Stoll.

Twenty-one students were registered for courses leading to the degree of Bachelor of Science in dental hygiene and eleven special students were registered for a graduate course in dental health education.

The curriculum for the dental hygienists course was revised to permit the inclusion of courses in the field of public health, thereby fulfilling the requirements for traineeships authorized by the Health Amendments Act of 1956. As a result, the United States Public Health Service has designated this school as eligible to accept students under this act—the only school east of the Mississippi so designated.

Recruitment of qualified candidates for enrollment continues to be a major effort. Wide distribution of a manual prepared by Professor Stoll, *The Dental Hygienist—A Professional Career for Women*, was made to colleges and junior colleges. This has resulted in a favorable response from college women. Contacts with college guidance counselors have continued to be a valuable stimulus to student supply.

Columbia graduates continue to be sought for top positions in all fields, including the United States Public Health Service, State Health Department, and public school systems.

DIVISION OF OPERATIVE DENTISTRY

This division, under the direction of Professor Carl R. Oman, has carried on a heavy undergraduate teaching schedule and an active research program. The usual courses were increased by the one given in operative technique to the freshman in the new curriculum.

Dr. Thomas Portway, a graduate of the Class of 1956, joined the staff as a full-time clinical assistant. Dr. Richard C. Fowler resigned as a volunteer clinical assistant to devote his full time to private practice. Some other members of the part-time staff have found it necessary to reduce their time devoted to the school.

Professor Oman has continued his development of ultrasonic cutting of tooth structure. It is planned to include training in the use of ultrasonics in next year's teaching program.

Research activities of the division are (a) a study of the use of mephensin in operative dentistry by Professors Harold Sherman, Joseph E. Fiasconaro, Edward A. Cain, Jr., and John W. Fertig of the School of Public Health and Administrative Medicine; (b) an evaluation of experimental local anesthetics solutions by Professors Sherman and Fiasconaro; and (c) plethysmographic comparison of new high-potency local anesthetic solution by Professors Sherman, Fiasconaro, and Harry Grundfest of the Department of Neurology.

The endodontia staff under the leadership of Professor Joseph M. Leavitt has developed a new culture medium for the growth of aerobes and anaerobes in the same tube. They are studying the bacterial flora of infected root canals and the sensitivity of root-canal organisms to a new polyantibiotic, antifungal, antihistaminic combination (neomycin, gramacidin, nystatin, pyribenzamine).

DIVISION OF ORAL SURGERY

This division, directed by Professor William J. Savoy, is meeting its responsibilities, but with difficulty because of a limited staff. The staff is composed entirely of part-time men and loss in recent years of full-time men on the staff has placed a severe strain on those remaining. The staff has responded splendidly to the situation by conducting staff meetings regularly, participating in the lecture program, and experimenting with teaching procedures.

A revised form of teaching local anesthesia and exodontia was tried on a segment of the junior class: selected cases were performed on a comprehensive basis, from history-taking through the completion of extractions. The student response to the change was so gratifying that it will be continued. Physical facilities for this type of teaching are not convenient and should be improved.

Research activities have been restricted because of staff shortage and have been limited to joint efforts with other divisions where oral surgery cooperation was essential.

The new members who have recently joined the staff are Drs. Milton Jaffe, Robert S. Neulist, and Richard J. Lowell.

DIVISION OF ORTHODONTICS

Professor Arthur C. Totten has directed this division for the past twelve years and will retire on June 30, marking culmination of twenty-eight years of faithful service to the division and school. Professor Nicholas DiSalvo, previously of the Department of Physiology, will assume the duties of director of the division on July 1.

Twenty-two candidates completed the program of study during the year and were graduated with the Certificate of Training in Orthodontics. Postgraduate teaching was the major activity of the staff.

The undergraduate course was widened to permit the teaching of prevention and correction of simple types of malocclusion and adult orthodontics associated with restorative procedures. This addition was received favorably by the students since it is a type of service that should be rendered by the general practitioner.

Two short courses were given during the year and were attended by thirty-one practicing orthodontists.

The division's research program was active and included the project on the temporomandibular joint which was continued in conjunction with the Department of Anatomy; the work on the serial study of occlusion of mixed dentition, which was continued for the tenth year; the Wetzel Grid project, which was in its second year; a project to determine whether or not obturators are necessary for good speech in cleft-palate cases; a project

to study the limitation of cleft-palate orthodontics; a study of the use of the anterior pituitary-like substance in orthodontics; and an investigation in conjunction with the Department of Anatomy to determine the temporal range and variation of epiphyseal closure of phalanges and distal ends of ulnar and radius in adolescents.

DIVISION OF PEDODONTICS

The division is under the direction of Professor Solomon N. Rosenstein.

The accomplishments in the children's dental clinic have been maintained on a high level of service and quality. One hundred and forty children were admitted to the clinic. There were approximately 1,160 individual sittings. The average number of visits per child was 8.3. The total number of restorations and completed treatments, including pulp management procedures, was approximately 1,650. Throughout the year, an average of 1.4 completed treatments per visit was maintained.

The postgraduate program was carried on as in the past. The fellowship course in cerebral palsy and pedodontics, developed to train and educate dentists in the medico-dental problems in cerebral palsy, was found sufficiently broad in scope to prepare the fellows to manage patients with other neuromuscular handicaps, mental retardation and emotional disturbance, and other conditions. The scope of service of the clinic facility associated with this program has been expanded to permit admission of children with these other handicaps. In addition to their training, which prepares them for the many special problems in dentistry for handicapped children, the graduates are also prepared to establish and staff similar dental facilities in other geographic areas. This program, developed six years ago by the division, with the collaboration of members of the Department of Physical Medicine and Rehabilitation and the pediatrics cerebral palsy clinic, is still the only program of its kind in the world.

The research activities in pedodontics have been developed to parallel certain parts of the curriculum, namely, clinical aspects of dental development, caries incidence and prevention of dental and oral disease, and caries control and tooth conservation. They include a study of rampant caries in young children in relation to early feeding habits, pulp management procedures, study of normal ranges in variation in tooth development and eruption, and a study of the relation between prenatal disturbances and dental malformation in infants.

New members of the division staff are Drs. Mark Benes and Jerry J. Adelson.

DIVISION OF PROSTHETICS

Under the direction of Professor Gilbert P. Smith, the division has completed the year's program of undergraduate teaching which was basically the same as that of last year, but with the addition of the freshman technique courses introduced in the new curriculum. The staff is to be con-

gratulated upon their cooperation in assuming this addition to an already heavy schedule—approximately 30 percent of total student class hours in the four year course.

Staff assignments were rearranged among the courses so as to equalize teaching load. The established policy of rotating assignments among staff members so that they would be experienced in the teaching of all phases of the division's work has given a flexibility that has proved helpful in this temporary situation. Professor Howard A. Arden was in charge of oral-anatomy, prosthetic, and crown-and-bridge technique courses. Professor Robert E. Herlands was in charge of clinical crown-and-bridge courses. Professor George W. Hindels supervised clinical work in removable partial dentures. Professors Max A. Pleasure and John J. Lucca assumed joint supervision of the clinical full-denture work. Professor Herbert D. Ayers conducted the course in dental materials and processed the gold alloys used in the clinic.

With the heavy teaching program, research activities of the division have been limited. In the dental materials field Professor Ayers has been studying a number of problems associated with rustless metal joints as used in dentistry. Professor Pleasure and Dr. William C. Hudson, Jr. have been studying the use of synthetic rubber for various types of impressions.

In the clinical field Professor Hindels continued his survey of all removable partial-denture cases completed in our clinic and centered his interest this past year on developing improved occlusal rests. Dr. Ennio L. Uccellani has a project underway to evaluate the use of AHR-85 as an aid in obtaining centric relation. Professor Ayers is carrying on a study of the measurement of pain produced by mechanical stimulation of dentine.

In addition, seven members of the division are participating actively in research groups of the Greater New York Academy of Prosthodontia.

New members to join the staff during the year were Dr. Robert Kelley and William C. Hudson, Jr. Dr. George W. Schwendener returned to duty at the beginning of the academic year after a prolonged leave of absence due to illness.

DIVISION OF STOMATOLOGY

Professor Edward V. Zegarelli has directed this division, which covers the fields of oral diagnosis, roentgenology, periodontia and dental therapeutics.

The section of oral diagnosis and roentgenology is supervised by Professor Zegarelli and carries on an active teaching as well as research program. Research studies underway cover a wide range of oral lesions and at present include cheilosis, oral keratosis, aphthous stomatitis, idiopathic glossodynia, idiopathic orolingual paresthesias, cementomas, and oral manifestations of pemphigus.

The periodontia section is supervised by Professor Frank E. Beube and is carrying on an active program in both undergraduate and postgraduate

courses. An innovation this year was the assignment of a periodontal staff member to the prosthetic clinic to integrate the work of the two divisions and thereby improve the teaching of the students and the service given to patients.

The periodontal staff has continued their active research program and the projects include studies on the value of osteogen in bone regeneration, the measurement of mandibular force, the use of telfa as a periodontal surgical dressing, periodontal wound healing in nonvital teeth, the rate of growth of epithelial pocket lining, periodontal healing under sliding gingival flaps and calculus formation.

New members of the division staff are Drs. Howard P. Sanborn, Agate Suurkivi, Norman A. Joondeph, and Sheldon R. Baldinger.

RESEARCH

The chairman of the Research Committee is Professor Barnet M. Levy. During the chairman's sabbatical leave, the secretary, Professor Edward V. Zegarelli, has directed its functions most capably. The Research Committee was established this year to stimulate interest and coordinate all research activities of the school.

In spite of meager research space and inadequate facilities, there are at present 104 research projects under way in the dental school. All divisions of the dental school have several research problems in progress, an indication of the depth and breadth of interest in investigational pursuits. Efforts are being made through the National Institutes of Health to obtain greater financial assistance for various research projects contingent upon our ability to provide adequate research space and facilities.

The National Institutes of Health have granted six part-time research fellowships for dental students and two post-sophomore research fellowships to our institution. The students have been assigned to their research projects and are actively engaged in investigations under the direction of various staff members.

During the past year, fifty-nine articles were written by members of the dental department staff and published in a number of outstanding journals.

The staff has also been active in contributing to the profession by appearing before dental organizations. During the past year 334 papers, lectures, or clinics have been presented before professional groups by staff members.

DEPARTMENT OF DERMATOLOGY

Professor CARL T. NELSON, Executive Officer

It is with profound regret that we record the death of Professor Rhoda W. Benham on January 17, 1957. An investigator and teacher of international reputation, Professor Benham had served the department with

great distinction for thirty years. Shortly before her untimely death, Professor Benham's former students and many friends, here and abroad, had joined in the preparation of a volume of letters and photographs in her honor. This commemorative volume remains as a tribute to this outstanding scientist whose kindness, integrity, and humility endeared her to all who knew her.

During the year, Dr. Margarita Silva was promoted to assistant professor and assumed direction of the activities of the Division of Mycology. It is also a pleasure to record the promotions of Dr. Beatrice M. Kesten to associate professor of clinical dermatology and Dr. Leslie P. Barker to associate clinical professor. Dr. Helen O. Curth was promoted to assistant clinical professor and Dr. Marvin Brodey was appointed assistant in dermatology.

The undergraduate curriculum and the graduate training program for residents and fellows in dermatology underwent no major changes during the past year. The establishment of an additional residency position for the dermatological service in Presbyterian Hospital enabled the chief resident to participate more actively and effectively in the clinical instruction of third- and fourth-year medical students.

During the academic year, special lectures and seminars were given by Professor Leonard T. Chavkin of the Columbia University College of Pharmacy; Professor John T. Ingram of the University of Leeds, England; Dr. Carlos daSilva, Lacaz of the University of São Paulo, Brazil; Dr. Maurice Lenz, consultant in radiology at the Presbyterian Hospital; Mr. John Reynolds of the Picker X-Ray Corporation, New York; and Professor R. Vanbreuseghem of the University of Brussels, Belgium. Other guests of the department included Dr. Phadiang Balankura of the University of Bangkok, Thailand; Dr. Abhaya Jamuni of Chulalongkorn University, Thailand; and Dr. Adil Hakki of the Ministry of Health, Baghdad, Iraq.

The research activities of the members of the department continued at a high level and again reflected a variety of interests. Professor George C. Andrews, with Drs. Anthony N. Domonkos and Victor M. Torres, completed a study of the outcome of treated and untreated hemangiomas in more than 1,000 patients. Dr. Domonkos also continued the study of neutron activation analysis of arsenic in cutaneous epitheliomas and keratoses.

Professor Barker and Dr. John T. McCarthy initiated a study of biotin levels in the blood of patients with various exfoliative dermatoses. With Professor Dorothy H. Andersen of the Departments of Pediatrics and Pathology, Professor Barker also began a study of the histologic variations in normal fetal and infant skin. Professor Helen Curth continued the long-term investigation of the relationship of acanthosis nigricans to visceral cancer. With Professor Paul Gross, Professor Curth completed a study of the genetic interrelationships of psoriasis. Dr. Bohdan Dobias continued the study of the hematologic and metabolic effects of an endotoxin derived from

C. albicans. This investigation has now been extended to include a study of the effects of this product on leukemic animals.

Professor J. Lowry Miller, in collaboration with Dr. Justina H. Hill and Dr. Brodey, extended the long-term study of the prophetic significance of persistent biologic false-positive reactions with standard serologic tests for syphilis in otherwise apparently normal individuals. Dr. Hill also initiated an investigation of the occurrence of negative *T. pallidum* immobilization tests in patients with clinical evidence of congenital syphilis and has continued the study of the comparative diagnostic effectiveness of the *T. pallidum* complement fixation and immobilization techniques.

Professor Silva extended the investigation of the relationship of amino acid metabolism to the growth and morphology of dermatophytes and other fungi. With Dr. Hennie Haaland, Professor Silva completed a survey of carriers of *Cryptococcus neoformans*. Mr. J. Dennis Pollack and Professor Silva studied the effects of diet and dermal ischemia on the susceptibility of animals to infection by *E. floccosum*. Mr. Pollack also investigated the nutritional factors responsible for the production of the diagnostic chlamydospores by *C. albicans* on artificial media. Dr. Elizabeth Hazen completed a study of the effect of temperature and nutrition upon macroconidial formation by *M. audouinii*.

Drs. Leo Schweich and McCarthy continued the clinical study of the therapeutic effect of biotin in selected dermatoses and also initiated an investigation of the value of a combination of antimalarial drugs in the treatment of chronic discoid lupus erythematosus. Dr. Milton B. Sloane studied a new medium for the differential isolation of pathogenic *Candidas* and also began a clinical investigation of the therapeutic value of a new antibiotic, amphotericin A and B, in the local treatment of superficial fungus infections.

Professor Nelson and Dr. Brodey continued the follow-up study of patients with pemphigus who have been treated with corticosteroids. With Dr. Joseph Rapaport and Dr. Gerald B. Phillips of the Department of Biochemistry, Professor Nelson also made further observations on the specificity of the Kveim reaction in sarcoidosis and the identity of the chemical complexes responsible for this phenomenon. Mrs. Julia M. Einbinder and Professor Nelson continued the investigation of the effects of corticosteroids and serotonin-antagonists on tissue electrolyte changes in hypersensitiveness.

During the year, twenty-four papers were published by members of the department. The Spanish and Italian editions of Professor Andrews' textbook, *Diseases of the Skin*, were also prepared for publication. In addition, fourteen members of the department gave a total of thirty-four presentations before various scientific meetings. Professor Kesten again served as secretary of the American Board of Dermatology. Professor Miller was secretary of the New York Dermatological Society and vice-chairman of the Section on Dermatology and Syphilology of the Medical Society of the State of

New York. Professor Andrews again was chairman of the panel on cutaneous malignancy of the American Academy of Dermatology and Syphilology, and Dr. Domonkos was chairman of the panel on dermatologic photography of that organization. Professor Nelson became a member of the Subcommittee on the Cutaneous System of the National Academy of Sciences and also was chairman of the Section of Dermatology and Syphilology of the New York Academy of Medicine. Professors Gross and Helen Curth and Dr. Bertha Aschner were invited to participate in the First International Congress of Human Genetics in Copenhagen.

DEPARTMENT OF MEDICINE

Professor ROBERT F. LOEB, Executive Officer

It is with pride and deep satisfaction that the awarding of the 1956 Nobel Prize for Medicine and Physiology to Professors André Cournand and Dickinson W. Richards is recorded. For many years they have devoted tireless efforts to the extension of our knowledge of the basic problems of the physiology of the heart and lungs in man. They and their associates have shown rare ingenuity in the development of methodologies, not only catheterization of the heart, but also many others which have permitted for the first time precise quantitation of hemodynamic processes as well as phenomena of pulmonary ventilation and gas exchange across the capillary-alveolar membranes. They have also studied various disease processes and have clarified in quantitative terms their underlying mechanisms. This type of information has served as a basis for rational approaches to treatment of a variety of cardio-respiratory disorders. The contribution of Professors Cournand and Richards to medical education and to the stimulation of research is attested to by the galaxy of men and women now active in investigation in university clinics throughout the world who have received their inspiration in the laboratories of Columbia University at Bellevue and at the Presbyterian Hospital.

It is gratifying to enumerate other distinctions which have come to members of the Department in the past year. Professor Karl Meyer received a Lasker Award in recognition of his fundamental and pioneering studies on the chemical nature of connective tissue. Connective tissue constitutes one of the largest components of the body and is the supporting tissue of all organs. Disturbances in the connective tissue are responsible for a variety of diseases including rheumatic fever, rheumatoid arthritis, disseminated lupus erythematosus, and others. The connective tissue is highly complex in morphologic and chemical structure. The problem posed by its formidable complexity has constituted a challenge that few chemists before Professor Meyer have been willing to accept. The advances made by Professor Meyer in this difficult field of chemistry have exceeded all hopes and

expectation. Now that the "ice has been broken," numerous chemists are entering this domain, and knowledge is increasing at a rapid rate.

During the past year Professor Stanley E. Bradley has been president of the American Society for Clinical Investigation and has completed a term of five years as editor of the *Journal of Clinical Investigation*. He also has represented the Harvey Society in this country at the Harveian Tercentenary in England at which he and Professor Cournand gave addresses. Professor Bradley also lectured at the London School of Tropical Medicine and served as external examiner at the University of Belfast. He was also made a member of the Scientific Council of the Life Insurance Medical Research Fund. Professor Cournand lectured in Paris, Stockholm, and Madrid. He was made a foreign member of the Academie des Sciences, Institut de France, and a Foreign Corresponding Member of the Belgian Royal Academy of Medicine. Professor Richards received the honorary degree of Sc.D. at Yale University. He was also chairman of the Advisory Council of the Life Insurance Medical Research Fund. Professor Harry W. Fritts lectured at the International Congress of Physiology in Brussels. Professor René Wégria lectured at the Universities of Louvain and Liège. Professor M. Irené Ferrer lectured at the Inter-American Cardiological Congress in Cuba. Professor Franklin M. Hanger was elected to the Board of Regents of the American College of Physicians. Professor John V. Taggart became a member of the Council of the American Society for Clinical Investigation and of the Harvey Society. He was also appointed to the Editorial Board of the *Journal of Clinical Investigation*. Professor Joseph W. Jailer was elected to the Council of the Endocrine Society and the Board of Editors of the *Proceedings of the Society for Experimental Biology and Medicine*. He was elected an honorary member of the Royal Society of Obstetrics and Gynecology of Belgium and was made consultant to the Cancer Chemotherapy Study Section of the National Institutes of Health. Professor Charles A. Ragan served on various committees of the Arthritis and Rheumatism Foundation. He also served on the Training Committee of the National Institute for Arthritis and Metabolic Diseases. Dr. Felix E. Demartini is secretary-treasurer of the New York Chapter of the Arthritis and Rheumatism Foundation. Professor Dana W. Atchley addressed the Council on Medical Education of the American Medical Association and has been chairman of the Panel on the Medical School of the Committee on the Educational Future of Columbia University. Professor George A. Perera was elected a member of the American Board of Internal Medicine and served on two committees of the Association of American Medical Colleges. Dr. Richard J. Cross, former Walter W. Palmer Fellow, has been appointed assistant dean of the Medical School. Dr. Kermit L. Pines was made a director of the New York Diabetic Association. Dr. Calvin H. Plimpton has been appointed professor of medicine at the American University at Beirut, Lebanon, and will be on leave of absence from the Depart-

ment of Medicine. Dr. Henry D. Grossfeld has been invited to address the International Congress for Cell Biology at the University of St. Andrews and also the International Meeting for Tissue Culture in Glasgow. Dr. Henry O. Wheeler was appointed a scholar of the John and Mary R. Markle Foundation. Professor Robert F. Loeb was made an honorary fellow of the Royal College of Physicians of London and a foreign corresponding member of the British Medical Association. He was also elected honorary foreign member of the Association of Physicians of Great Britain and Ireland, and received an honorary degree of D.Sc. from Kenyon College. In addition to these activities many members of the department have delivered lectures at a large number of universities and society meetings throughout the country.

As in other years distinguished visitors from abroad and this country have participated in the educational activities of the department. From France, Professor Pierre Grabar of the Institut Pasteur appropriately delivered the first Michael Heidelberger Lecture, as he had worked some years ago in Professor Heidelberger's laboratory in the Department of Medicine. Professor C. R. B. Blackburn, a former fellow in the department, and currently the first full-time professor of medicine at the University of Sydney, Australia, as well as Dr. D. A. K. Black of the University of Manchester and Dr. Malcolm Milne of the London Postgraduate Medical School lectured. Among distinguished scientists from this country who conducted conferences and seminars were Drs. Ephraim Racker, Homer W. Smith, John Pappenheimer, R. E. Davies, George V. Browne, Christian Anfinsen, H. Bentley Glass, Seymour Kety, Irving London, and John Brobeck. Their contributions to the educational program of the department are gratefully acknowledged.

It is with deep regret that the death of Dr. Gwendolyn S. Jones is reported. For many years Dr. Jones discharged her function as physician to the Department of Nursing with skill and devotion. Her ministrations will be greatly missed. On June 30, Professor Bertram J. Sanger and Dr. Lawrence H. Cotter retired after more than three decades of association with the department. Professor Sanger has for many years been in charge of the Diabetic Clinic in Vanderbilt Clinic and the Metabolism Ward of the Presbyterian Hospital. Dr. Cotter has been primarily concerned with chemical hazards in industrial medicine. Dr. Kermit L. Pines will assume Professor Sanger's responsibilities. It is a pleasure to announce the following promotions: to clinical professor from associate clinical professor, Hamilton Southworth; to assistant professor from associate, Drs. Cross, Harry W. Fritts, Daniel L. Larson, Paul A. Marks and Elliott F. Osserman. Professor Jack Davidson has resigned to assume a post in the National Cancer Institute.

It is a pleasure to report in brief at least a part of the research activities of the members of the department. During the past year, Professor Bradley

worked with a group of fellows, including Drs. Wheeler, Robert Epstein, Roscoe R. Robinson, and Dr. Eric Snell of St. Mary's Hospital, London. The complexity of studies undertaken required close work together as a team, but each man assumed a special responsibility for an individual area. The development of a direct method (rotameter) of measuring hepatic blood flow in the dog by Dr. Wheeler has made it possible to define more clearly the uptake of dye into "storage," i.e., into the hepatic cells during equilibration as the blood level is rising. Dr. Wheeler has also developed a simple method of determining both T_m and relative storage capacity that will permit exploration of these functions in man. Dr. Robinson has continued work on the effects of irreversible shock upon hepatic circulation and metabolism, studying changes in splanchnic blood volume, hepatic oxygen consumption, and lactate and glucose transfer following hemorrhage and restoration of the blood volume to normal.

Dr. Epstein has completed a study of the effect of anesthesia and hypercapnia upon the hepatic circulation. This work has been conducted for several years in collaboration with Professors Emanuel M. Papper and Jack M. Frumin of the Department of Anesthesiology and Professor David V. Habib of the Department of Surgery.

Dr. Snell has been active in developing a means of measuring temperature (thermistor) within the hepatic veins in the dog in the hope of evaluating hepatic function in terms of caloric production and of making a fresh approach to an analysis of the effect of the pyrogenic reaction on the liver.

The members of the enzyme laboratory, under the direction of Professor Taggart, have continued their studies on metabolism and active transport in the kidney. Dr. Geoffrey M. Kellerman, a Rockefeller Foundation Fellow from the University of Sydney, and Dr. Alvin Essig are engaged in studies on various acyladenylates. The possible role of acyladenylates in the tubular excretion of certain aromatic acids is being explored by the use of compounds labeled with o^{18} . Additional studies on the kidney are concerned with the tubular excretion of ethereal sulfates and the relationship between molecular structure and tubular transport. Dr. William J. Hensley, a second Rockefeller Foundation Fellow from the University of Sydney, completed his observations on the transport of glycine in sacs of everted small intestine of the hamster. Dr. Marc C. J. Dorner, a Rockefeller Foundation Fellow from the University of Strasbourg, is studying the enzymatic properties of the pigment-bearing particles of a transplantable mouse melanoma. These particles, although much smaller than most mammalian mitochondria, contain the enzymes which implement the citric acid cycle and aerobic phosphorylation. Particular attention is being given to the relationships between aerobic phosphorylation, the exchange of orthophosphate in ATP, and the adenosinetriphosphatases. Professor David Schachter, who has returned to the department after two years at the Air

Force School of Aviation Medicine at Randolph Field, has undertaken a systematic study on the metabolism of the salicylates. Sensitive spectrophotofluorometric methods have been developed for the estimation of salicylate and its principal conjugates both in urine and plasma. The methods permit a differentiation between free salicylate, salicylurate, and the acyl and ester glucuronides. The blood levels of salicylate and the various conjugates obtained with different dosage regimens, their binding on the plasma proteins, and the renal mechanisms for their excretion are under investigation. Dr. Cross and Professor Taggart have continued their studies of the nucleotide content of dog kidney by attempting to correlate changes in the adenosine nucleotides with the ability of the kidney to carry on active transport.

Studies on the structure and degradation of acid mucopolysaccharides of connective tissue have been continued by Professor Meyer. In collaboration with Drs. Alfred Linker and Philip Hoffman, a new type of hyaluronidase was demonstrated. Extracts of leech hydrolyse the uronic bonds of hyaluronic acid leading to di- and tetrasaccharides with glucuronic acid as the reducing end group. These new carbohydrates have also been obtained by a combined chemical and enzymatic degradation. The various oligosaccharides and their isomers will be valuable in studies on the synthesis of these complex carbohydrates. An adaptive bacterial enzyme which hydrolyses chondroitin sulfate B is being studied in collaboration with Dr. Edward Korn of the National Institutes of Health.

By enzymatic degradation and combination with chemical methods the structure of sialic acid was elucidated by Professor Meyer in collaboration with Dr. Ralph Heimer. Two guests from abroad have been working in the laboratory: Dr. Gerald Loewy, a fellow from Oxford University, who is studying the polysaccharides and enzymes of embryonal connective tissues, and Dr. Nelly Rosenkrantz of the University of Jerusalem, who is studying the oxidative breakdown of hyaluronic acid.

During the past year Dr. Laragh has continued his studies of the hormonal and electrolyte factors in heart failure. Measurements of aldosterone in the urine and its correlation to the edema of heart failure and cirrhosis have been continued, and observations on the possible relationship of hormonal factors in certain sodium-losing diseases have also been made. A study has also been made with Dr. Helen M. Anderson of the hyperkalemia which is often observed in sodium-depleted patients, by investigating the ability of the kidney tubule to secrete potassium efficiently under conditions of hyponatremia. Further studies have been carried out on animals with experimental edema by measuring their excretion of aldosterone. Efforts have been continued to measure the hormone in the adrenal venous blood and experiments involving perfusion of the gland are under way. With Dr. Demartini, twenty-two metabolic balance studies on human subjects have been carried out, using the new oral diuretic, chlorothiazide.

Professor Abbie I. Knowlton and Dr. Emily N. Loeb, in conjunction with Dr. Herbert C. Stoerk of the Merck Institute for Medical Research, have continued their investigations on the effects of adrenal steroids and their synthetic analogues upon the blood pressure of the rat. As an avenue of investigation into the differences between the types of experimental hypertension induced in the rat by desoxycorticosterone acetate (DCA) and by cortisone acetate (Cort. A) analyses of the electrolyte content of whole carcasses and also of aortae have been undertaken by Professor Knowlton and Drs. Loeb and Stoerk.

A number of fellows, including Drs. Dorothy T. Krieger, Adele D. Hofman, Roy A. Wiggins, Jr., and Julian I. Kitay, have spent the past year in the endocrine laboratory of the Department of Obstetrics and Gynecology associated with Professor Jailer. The presence of a factor which is capable of maintaining adrenal weight in hypophysectomized rats has been detected by Professor Jailer and Dr. Nicholas P. Christy in the plasma of patients with Cushing's syndrome due to bilateral adrenal hyperplasia.

In collaboration with Dr. Krieger, hypothalamic lesions were produced in cats and it was seen that destruction of the median eminence prevented the release of ACTH as a result of insulin shock. Dr. Christy, with Dr. Mary Knight of the Department of Psychiatry, has shown that pre-treatment with chlorpromazine achieves similar results in patients. Dr. Kitay has developed a new *in vitro* assay for ACTH which depends upon the release of corticoids from rat adrenal slices. This assay method shows promise of being a useful tool in elucidating many aspects of pituitary physiology. Dr. Wiggins has studied certain aspects of salt metabolism and aldosterone secretion in patients with pan-hypopituitarism.

Dr. Christy and Mr. Carl M. Pellmann, a third-year student, have been studying the time-corticotropin relationship on the recovery rate of the adrenal cortex atrophied by steroid administration.

The past year marked the tenth year of the release of I-131 from Oak Ridge and the tenth year of its use at the Presbyterian Hospital. In this period, a series of 525 patients were treated and followed by Professor Sidney C. Werner. This work has been summarized in collaboration with Professor Edith H. Quimby of the Department of Radiology, Dr. Robert Day of the Department of Ophthalmology, and Dr. Bento Coelho, a fellow from Brazil.

Professor Werner, in collaboration with Dr. Richard Block of the Boyce Thompson Institute and Dr. A. A. H. Kassenaar of the University of Leyden, Holland, has studied a child with mild hypothyroidism, congenital goiter, and a high serum precipitable iodine level. An inborn error of metabolism is seen as the pathogenetic mechanism, namely, a defect in the enzymatic coupling of diiodotyrosine. As a by-product of this work, a method for paper chromatography of the iodinated compounds in serum has been developed so that doses of 125 millicuries I-131 can be used instead

of the 5 or more millicuries currently required. An enzymatic defect at the stage of release of thyroid hormone from the gland has been identified in collaboration with Drs. Block and Mr. Richard H. Mandl. An iodoprotein was identified in serum which bound half the circulating thyroxine and led to a state of hypothyroidism.

The procedure, recently developed by Professor Marcel Goldenberg and Dr. Gerald Cohen for the simultaneous determination of adrenaline and nor-adrenaline has been applied to plasma analyses. Abnormally high and diagnostically significant plasma concentrations have been recorded in pheochromocytoma.

Adrenaline and nor-adrenaline infusion experiments with psychiatric patients and normal volunteers have been initiated in conjunction with Dr. Bernard Holland of the Psychiatric Institute. The *in vivo* rates of destruction of adrenaline and nor-adrenaline, together with associated symptomatology are under study.

The central theme of the cardio-respiratory laboratory under the direction of Professor Alfred P. Fishman continues to be the study of the interrelations between the respiration and circulation in man. The work has taken several major directions:

1. The evaluation of factors which enter into the measurement of the diffusing capacity of the lung in normal man and in patients with various types of heart and lung disease. The results of these studies have been the subject of two brief reports to the American Physiological Society by Drs. Gerard M. Turino, Martin Brandfonbrener, Roberta M. Goldring, and Professor Fishman.

2. The measurement of the effective collateral circulation which develops in the lungs of man following either occlusion of a pulmonary artery or intrinsic pulmonary disease—a complicated procedure involving a combination of bronchspirometry, cardiac catheterization, and arterial cannulation to measure variables which have heretofore only been approximated on the basis of animal experiments.

3. The definition of the physiological characteristics of the syndrome of alveolar hypoventilation. The basis for this general concept is a fairly large experience with patients with impaired ventilatory function due to a structural deformity of the chest, obesity and a variety of neurological and neuromuscular diseases.

4. The development of methods for the precise distinction between defects in distribution of inspired air within the lung as distinct from impaired transfer of gases between the alveoli and pulmonary capillaries. To this end, specialized apparatus such as the nitrogen analyzer have been used, and a new technique for blood analysis for carbon dioxide tension has been developed by Drs. Gustave A. Laurenzi and Robert P. Cameron with Professor Fishman.

5. The identification of the nature and characteristics of the alveolar-

capillary membrane. This work, in its initial phases, attempts to gain further insight into the functional characteristics of the alveolar-capillary interface and involves estimation of rates of transfer of injection substances across this boundary. Dr. Brandfonbrener, working with the help of Professor Albert A. Plentl of the Department of Obstetrics and Gynecology, is applying radioisotope techniques to this problem.

6. A comparison of metabolic as well as cardiorespiratory activity in patients with cystic fibrosis of the pancreas and in adults with various types of chronic obstructive pulmonary emphysema. This study attempts to gain insight into the nature of chronic obstructive pulmonary emphysema in adults. It involves the conjoint efforts of Dr. John A. Wood, Professor Paul A. di Sant'Agnese of the Department of Pediatrics, and Dr. Keith Reemtsma of the Department of Surgery.

Drs. James R. Golub, fellow of the Dazian Foundation, Jiro Nakana, fellow of the New Jersey Heart Association, Gerhard Muelheims, and Robert Jreissaty, with Professor Wégria, have continued their study of problems concerned with the regulation of the coronary circulation, cardiac work, and metabolism under varied conditions. It has been found that in auricular tachycardia of progressively increasing rates, cardiac work and efficiency decrease, whereas coronary blood flow and cardiac oxygen consumption increase. During tachycardia, the consumption of glucose, lactate and/or pyruvate by the myocardium also increases. The effect of acute mitral insufficiency on cardiac work and metabolism has also been studied. At the present time the effect of aortic insufficiency on cardiac work and metabolism is being investigated. Preliminary experiments have been conducted on the effect of nicotine and pitressin on cardiac work and metabolism.

Professor Perera, with his interest in hypertension, has devoted considerable time to the study of new drugs and is now turning his attention to the accelerated ("malignant") form of the disease. Chlorisondamine and mecamlamine were shown to have some advantages over other ganglionic blocking drugs. With Dr. Albert Damon he has observed highly significant differences in the body build of women who develop the accelerated form, the first strong clue to a host factor in this disorder. In addition he has studied the effects of small doses of serotonin on sodium retention and has collaborated with several other clinics in a re-evaluation of the merits of sympathectomy for hypertension.

The Faulkner Arthritis Group under Professor Ragan has continued its study of rheumatoid arthritis. The serologic reactions seen in this disease are under investigation by Dr. Charles L. Christian, a trainee of the National Institute of Arthritis and Metabolic Diseases, who is attempting to characterize the rheumatoid factor and the reactant material in human gamma globulin. Dr. Stanley L. Wallace, another trainee of the National Institute of Arthritis and Metabolic Diseases, is studying the action of vari-

ous colchicine analogues in acute gouty arthritis in an attempt to dissociate the antimitotic effect of the drug from the beneficial effect in acute gout. Dr. Wallace has also surveyed the random muscle biopsies conducted at the Presbyterian Hospital for the past ten years and feels this procedure may be valuable in Boeck's sarcoid, arteritis, and dermatomyositis but is of little diagnostic help in rheumatoid arthritis or systemic lupus erythematosus. The study of juvenile rheumatoid arthritis carried out by Drs. Albert W. Grokoest and Arthur I. Snyder is nearing completion. Dr. Henry D. Grossfeld, in the histochemistry laboratory of the New York Orthopedic Hospital, has continued his tissue culture of the metabolism of the fibroblast particularly in relation to the effect of steroid hormones. Professor Gabriel C. Godman, head of the histochemistry laboratory, has carried out an extensive histochemical study of the L.E. phenomenon. Some of this work was carried out in collaboration with Dr. Richard A. Rifkind of the Department of Medicine. Cooperation between the Faulkner Group and the New York Orthopedic Hospital, the Columbia Division of Goldwater Memorial Hospital, and surgical pathology has continued on an effective level.

During the past year the serum abnormalities in lupus erythematosus have been investigated by Dr. Daniel L. Larson. In collaboration with Drs. Thomas B. Tomasi, John F. Watson, and Mr. Alan M. Aron, a third-year student, a method for the isolation of viable human leukocytes was developed, using osmotic shock with dilute acetated buffer. Nuclei were isolated from these leukocytes and subjected to extraction by classical aqueous methods. Highly polymerized DNA-histone was permitted to react in vitro with lupus gamma globulin and the nitrogen-phosphorus ratios of the precipitates were determined. Using gel-diffusion, immunophoresis, and quantitative precipitin techniques, it was shown that gamma globulin containing the "lupus factor" is probably qualitatively as well as quantitatively different from normal gamma globulin.

Professor Joseph C. Turner has continued studies of venom hemolysis, which is related to the chemical constitution of the red cell. Species differences in the distribution of membrane phospholipids have been encountered. With Dr. Anderson this work is being extended. Dr. Gerald B. Phillips, working in the Department of Biochemistry, has demonstrated for the first time the presence of lysolecithin in human serum. He has developed techniques for the isolation and quantitation of four phosphorus-containing constituents of lipid extracts of human serum.

Dr. Anderson with Professor Turner has undertaken the task of establishing a laboratory designed to evaluate the tests that may be employed clinically in the analysis of hemorrhagic disorders. This brings to the hematological service expanded opportunities for teaching and research.

Dr. Helen M. Ranney has extended studies of the synthesis of varieties of hemoglobin in a single individual to include patients with sickle-cell trait, hemoglobin C trait, and normal individuals. In collaboration with

Professor Salome Gluecksohn-Waelsch of the Albert Einstein College of Medicine, similar studies are being carried out in the heterogeneous hemoglobins of inbred strains of mice. Two methods for the clinical study of hemoglobin are being explored by Dr. Ranney: the use of starch electrophoresis for quantitative determination of hemoglobin A₂ in the diagnosis of thalassemia minor, and the use of column chromatography for determination of fetal hemoglobin. Dr. Ranney, in collaboration with Drs. Claire Liachowitz, Janet Elderkin, Iwan Guicherit, and Professor Harold W. Brown of the School of Public Health, carried out a survey of the distribution of abnormal hemoglobins in the Negroes of Surinam, South America.

Professor Yale Kneeland, Jr., and Mrs. Katherine M. Price in October of 1956 initiated a microbiological study of the trachea and lungs of cases autopsied routinely in the Department of Pathology. A semiquantitative study of the bacterial flora is being made, and these findings, together with mycological studies, are being correlated with antibiotic therapy before death. This is a long-term study and aims to include enough cases in different seasons of the year so that the results may have some significance. Virus studies of the material are also planned.

Professor William B. Sherman and Dr. Elliott J. Middleton, Jr., have been conducting experiments on the *in vitro* release of histamine from leukocytes which accompanies the interaction of allergic skin-sensitizing antibody and homologous antigen. Such information is being related to the degree of clinical sensitivity and to results of treatment. The effect of blocking antibody (produced during specific injection treatment) on histamine release *in vitro* is also under investigation.

Dr. Pines continued clinical studies with the sulfonamides advocated for the treatment of diabetes. Following withdrawal of carbutamide by the manufacturer as a result of high incidence of allergic manifestations and some fatalities, clinic patients have been given tolbutamide and an increasing number of patients are receiving this agent. With Dr. Hans Neuberger, Dr. Pines has extended studies on the threshold for the perception of vibratory sense, comparing diabetic and nondiabetic subjects. Dr. Pines has also gathered additional data on changes in the serum phosphorous concentration following the administration of sodium phytate in patients with sarcoidosis and other disorders.

With Miss Jane Andrews of the Food Clinic, Dr. Pines has embarked on a long-term study of the value of diabetic diets low in fat and cholesterol and with a high proportion of unsaturated fat. It is hoped that a definitive answer will ultimately be obtained regarding the influence of fat and cholesterol intake upon the development of complications.

During the past year Professor Michael J. Lepore and Professor Charles A. Flood have completed a study of various factors which influence prognosis in chronic ulcerative colitis. With Dr. George C. Hennig, a similar long-term study of the natural history of hiatus hernia is being completed. Studies

of esophageal motility in various diseases are in progress by Professor Flood together with Dr. Henry Colcher and Dr. James A. L. Mathers. Professor Lepore and Professors Paul A. di Sant'Agnese and Dorothy H. Anderson of the Departments of Pediatrics and Pathology are working on a blood test for gluten sensitivity in idiopathic steatorrhea. These workers likewise are continuing their studies of cystic fibrosis of the pancreas. Professor Lepore is collaborating with Drs. Harold G. Barker, Reemstma, and James Malm of the Department of Surgery on fat and fatty acid absorption in patients with a variety of malabsorptive disorders as determined with isotopically labeled materials.

Dr. Stuart W. Cosgriff has continued to evaluate the clinical practicality and usefulness of the bedside prothrombin test. He has also extended his study of the oral use of Vitamin K₁ so that at the present time this agent has been added to the hospital therapeutic regimen and contributes significantly to the safety of anticoagulant therapy. The program of ambulatory anticoagulant therapy in outpatients is being continued and extended. This program is relatively safe and practical, provided the inherent risks of anticoagulant treatment are understood. Among the groups of patients being treated are those with recurrent coronary occlusion, recurrent cerebral vascular accident, rheumatic heart disease with embolism of intracardiac origin, recurrent venous thromboembolic disease, and peripheral arterial disease with complications.

A newly developed pneumatic breathing aid that provides compression of the lateral chest wall has been tested by Professor Alvan L. Barach and Dr. Gustav J. Beck in thirty patients with pulmonary emphysema and ten with poliomyelitis; a sensing device employed with this so-called "rib squeezer" permits the patient to adopt a minute volume of ventilation more in accordance with his chemical needs than that provided by a fixed pressure and cycling rate. In collaboration with Professor Hylan A. Bickerman, Professor Barach devised a method of producing and eliminating bronchial secretions as is discussed in the studies carried out at Goldwater Memorial Hospital. Studies by Professor Barach made in collaboration with Professor Samuel Graff of the Department of Biochemistry and Professor Bickerman have confirmed the inhibitory effect of hypoxia on tumor growth in animals acclimatized to simulated high altitude. Professors Barach and Bickerman edited a volume entitled *Pulmonary Emphysema*.

AT BELLEVUE HOSPITAL

In the cardiorespiratory laboratory, Professors Cournand and Fritts have continued studies on the energy required for the mechanical work of breathing in patients with chronic pulmonary emphysema and in obese subjects. Professor Fritts, in collaboration with Drs. Charles A. Chidsey and Roy H. Clauss, is investigating a new method for the estimation of the amount of collateral circulation in the lungs, which in patients with bronchiectasis and

cirrhosis of the liver is draining in the pulmonary veins; this entails the simultaneous inscription of indicator curves from the pulmonary and brachial arteries. With Professor Aaron Himmelstein of the Department of Surgery and Dr. Peter C. Harris of London, Professors Fritts and Cournand have completed an investigation on the effects of lung perfusion with acetylcholine, and of unilateral and bilateral hypoxia upon the pulmonary blood flow and pressures. Professor William A. Briscoe is continuing his studies of ventilation/perfusion relationship in the least ventilated alveoli of patients with chronic pulmonary emphysema. Professors Ferrer and Rejane M. Harvey have continued their general survey of hemodynamic changes, particularly during exercise, in all stages of valvular and ischemic heart diseases.

A study of a new diuretic, chlorothiazide, is being carried on by Professor Harvey and Dr. M. Jay Goodkind. A factor from liver, said to increase the formation and appearance in the blood of neutrophilic leucocytes, the so-called L-factor, is being studied by Dr. Richard Conroy and Dr. Bella Strauss.

Professor Emeritus J. Burns Amberson and Professors John H. McClement, Julia M. Jones, Marvin Kuschner, and Dr. Anne M. Briscoe are continuing to correlate the clinical morphologic, bacteriologic, and chemical characteristics of resected tuberculous lesions.

A study of the home care of tuberculous patients has been completed by Professor Jones and Dr. Frances S. Lansdown. They have demonstrated that with properly selected patients it is possible to treat tuberculosis effectively and safely in an outpatient setting. They have identified many of the problems of home treatment, have illustrated the interdependence of hospital and clinic in working out a successful therapeutic program, and demonstrated the importance of patient education and good social evaluation. The incidence of tuberculosis among contacts to this group is very low, but this aspect of the study is being continued and expanded.

Dr. Ralph R. Tompsett of the Second (Cornell) Medical Division, Professor McClement, and Dr. Anne Davis are cooperating in a study of bacterial infections in emphysematous patients. In the outpatient clinic a group of patients with emphysema is being closely followed. Changes in the bacterial flora of these patients are being carefully followed by weekly culture of the sputum. Attempts are being made to alter the bacterial flora and the incidence of bacterial infections by chemotherapy.

A long-term study of the prognosis of tuberculosis of the pleura, pericardium, peritoneum, fallopian tubes, and lymph nodes under chemotherapy is being conducted by Professor Jones and Dr. Robert A. Henderson. Complete initial information on such cases is being collected, and arrangements for long-term follow-up have been provided. Dr. Robert Douglas of the Department of Obstetrics and Gynecology is cooperating in the study of a group of patients with tuberculosis of the female genital tract.

Professor Harvey continued in charge of the teaching of second-year

physical diagnosis. As was the case last year, patient material in the New York Veterans Administration Hospital has also been made available to the second-year students. Fourth-year student teaching continued as the major undergraduate educational activity of the general medical service. Special teaching sessions in cardiopulmonary disease by Professor Fritts, in cardiac fluoroscopy by Professor Harvey, in electrocardiography by Professor Ferrer, and in practical therapy by Dr. Harold H. Coppersmith were particularly well received. The educational programs of the second year, under the direction of Professor Kneeland, and of the fourth-year clerks under Professor McClement have not been changed significantly.

AT FRANCIS DELAFIELD HOSPITAL

Professor Jack D. Davidson continued studies upon the biochemical mechanism of action of certain antitumor drugs of the purine analog type, and upon the mechanisms of resistance to this action.

Professor Alfred Gellhorn and his associate, Professor Erich Hirschberg, have continued their investigations of experimental cancer chemotherapy. During the past year a new type of alkylating agent has been investigated which has the potentialities of acting both as an antimetabolite and as a nitrogen mustard. At the present time preliminary clinical investigation of the agent is in progress. Tissue culture and experimental animal investigations on the effect of a series of acridines and aminoquinolines on human and mouse brain tumors led to the clinical trial of quinacrine and amodiaquin in the therapy of glioblastoma multiforme in man.

During the current year the investigation of factors involved in the anemia of cancer has been continued by Dr. George A. Hyman. In view of the repeated demonstrations of the importance of increased hemolysis in the anemia of patients with cancer, investigation on red cell metabolism in cancer has been started by Drs. John E. Ultmann and Hyman. Animal studies have continued in an attempt to find a suitable tumor system for study of the mechanism of the increased hemolysis of cancer, and to study the effects of various therapeutic agents. Clinical studies involving the use of myleran in treatment of chronic leukemia and chlorambucil in the management of chronic lymphatic leukemia (in association with Professor Gellhorn and Dr. Ultmann) have been reported. Further evaluation of the role of triethylene melamine in combination with x-ray therapy of retinoblastoma employing different routes of administration has been made and reported with Professor Algernon B. Reese of the Department of Ophthalmology.

Dr. Paul A. Marks, in collaboration with Professor Philip Feigelson of the Department of Biochemistry, has extended his study of the formation of ribose and glucose in the liver and skeletal muscle of normal and tumor-bearing rats in vivo. In association with Mr. Robert H. DeBellis, of the third-year class, Dr. Marks has investigated the relationship between human erythrocyte aging in vivo and the level of activities of certain enzymes of

the pentose phosphate pathway. Drs. Marks and Jonathan S. Bishop have continued their studies of carbohydrate metabolism in human subjects with neoplastic disease and in rats with experimental tumors.

Studies of multiple myeloma, with particular reference to the associated abnormalities in protein metabolism, have been extended by Dr. Elliott F. Osserman during the course of the past year. Of major interest has been the study of an experimental, transplantable plasma cell tumor of mice which is associated with the appearance of an abnormal gamma globulin in the blood serum of the tumor-bearing animal, similar to that seen in the sera of patients with myeloma. Extensive studies have been made of the biological characteristics of this experimental tumor and of the abnormal serum protein. Clinical studies of patients with myeloma have continued and the series has been extended to over one hundred cases. Variants in the clinicopathological and biochemical features are being defined. Special clinical investigations, including a study of the defect in the homograft reaction in the myeloma subject, have been made.

AT GOLDWATER MEMORIAL HOSPITAL

The Columbia University Research Service at the Goldwater Memorial Hospital has one hundred beds and a group of laboratories in which investigation is conducted in such long-term illnesses as atherosclerosis, hypertension, cirrhosis of the liver, chronic nontuberculous pulmonary disorders, rheumatoid arthritis, and glomerulonephritis. Fourth-year students continue to serve as clinical clerks on the research service, and ward facilities of the entire hospital are made available for the eight sessions in the course on physical diagnosis conducted by Professor Kneeland.

Professor Forrest E. Kendall and Dr. Liese L. Abell are studying the influence of diet and hormonal imbalance upon the serum lipoprotein patterns of dogs in order to gain a better understanding of the factors involved in regulating the distribution of serum lipids between the alpha and beta lipoprotein fractions. With Professor Erwin H. Mosbach and Dr. Daniel Rudman, they are investigating the metabolism of different fats in rats. They have shown that the highly unsaturated fats are equivalent to the more saturated fats as a source of energy.

Professor Mosbach has continued his studies on the formation of biliary calculi in rabbits and mice following the addition of dihydrocholesterol in their diet. In collaboration with Professor Margaret Bevans, Professor Mosbach has shown that the dihydrocholesterol-induced cholelithiasis of rabbits can be largely prevented by the simultaneous oral administration of certain cholanic acids.

Dr. Rudman and Professor Kendall have studied the effect of hepatic disease and biliary obstruction on the concentration of conjugated and unconjugated bile acids in the serum. Dr. Rudman has also studied the distri-

bution of fatty acids in the serum and tissues of human subjects with a variety of diseases.

Professor Alfred Steiner and Dr. Seymour Dayton have reported on the hyperlipemia and early stages of atherosclerosis produced in rabbits by a high vegetable-fat diet consisting of ground peanuts and Purina chow. Professor Steiner and Dr. Fletcher P. Riley have completed their studies on the effect of the plant sterol, sitosterol, on the serum lipid concentration of individuals with coronary atherosclerosis. Professor Steiner is continuing his investigation of the effect of estrogenic hormones on the serum lipid pattern and clinical course of patients with coronary atherosclerosis.

Professor Steiner and Drs. Aristides G. Varsos and Rudman are studying the effect of the unsaturated fatty acids on the serum lipid levels of patients and experimental animals.

Professor Arthur R. Wertheim is conducting a study of some of the factors that influence dietary fat absorption in man. The effect of saturated and unsaturated fatty acids on postabsorptive lipemia is currently under investigation. In collaboration with Professor Mosbach and Dr. Abell, serum lipid electrophoretic patterns of rabbits are being compared with chemical measurements of fractions separated in a preparatory ultracentrifuge. The influence of diets containing 10 percent corn oil and/or 10 percent olive oil on the lipid patterns of rabbits is under study.

Dr. Henry Lax and Dr. Arthur W. Feinberg are continuing their work on the alterations in the appearance of the arterial pulse wave in the presence of hypertension and/or arteriosclerosis. They have now extended their studies to a group of patients with diabetes mellitus at the Vanderbilt Clinic.

Professor Quentin B. Deming, Drs. Marie M. Daly, Juan G. Edreira, and Aida Baltazar, and Professor David Seegal have continued their appraisal of certain drugs employed in the treatment of hypertensive vascular disease. They are currently evaluating the effect on hypertensive disease of prolonged decreases of the elevated blood pressure, using combinations of reserpine, hydralazine, and ganglionic blockage. Professor Deming, Dr. Abell, and Professor Mosbach find that doca-NaCl induced hypertension of rats on an atherogenic diet is associated with a greater degree of atherosclerosis and concentration of cholesterol in the serum and the carcass than is found in the absence of the hypertensive state. Drs. Daly and Esmeralda Gurpide are investigating the metabolism of arterial tissues and find that the rate of oxidative metabolism of the aorta is greater in the hypertensive than in normotensive rats. Other phases of the metabolism of these tissues are under study.

Professor Milton Mendlowitz working largely at the Mount Sinai Hospital is investigating the finding that intravenously infused norepinephrine, after prior sympathetic inhibition by direct heat and ganglionic blockage, produces greater digital vasoconstriction as measured by vasoconstrictive work, in subjects with primary hypertension than in normal individuals.

Professor Arthur J. Patek, Jr., and Professor Bevans are continuing their study of certain of the factors involved in the recovery phase of the experimental nutritional cirrhosis of rats.

Professor Hylan A. Bickerman, Dr. Elaine U. German, and Miss Sylvia E. Itkin are continuing their studies on the cough response to inhaled irritants in normal subjects and in patients with chronic pulmonary disease. The antitussive properties of a number of synthetic compounds have been studied by the use of this technique. With Professor Alvan L. Barach a method of obtaining bronchial secretions by the use of warm, hypertonic saline aerosols has been developed as a screening technique for the cytologic diagnosis of bronchiogenic carcinoma in apparently healthy individuals. Papanicolaou studies on the sputum obtained by this technique are being performed by Professor Edith E. Sproul of the Delafield Hospital. The inhibitory effect of hypoxia on Carcinoma 755 and Sarcoma 180 is being investigated in mice in an effort to determine the critical altitude at which inhibition is maximal without a deleterious effect on the host and the physiologic and protective effects of long-term acclimatization in a pressure chamber against the marked hypoxia occurring above 20,000 feet.

Professors Beatrice C. Seegal and Bevans have been utilizing the fluorescein technique of Coons to study the localization in rat glomeruli of rabbit antirat-kidney serum. Professor Seegal has immunized rabbits with human beta lipoprotein prepared by Professor Kendall. This antibody, tagged by fluorescein, is being used by Professors Seegal and Bevans to determine the localization of beta-lipoproteins in human tissues.

DEPARTMENT OF MICROBIOLOGY

Professor HARRY M. ROSE, Executive Officer

The department was honored by Professor Pierre Grabar, Chef du Service de Chimie Microbienne, Institut Pasteur, who delivered the first Michael Heidelberger Lecture on January 17, 1957. Other visitors included Professor Gerhard Schramm, Max-Planck-Institut für Virusforschung, Tübingen, and Professor Manuel Rocha é Silva, Instituto Biologico, São Paulo. Professor Barbara W. Low of the Department of Biochemistry gave an interesting and informative series of six seminars on x-ray crystallography.

Dr. Akira Mashimo, assistant professor of oral hygiene, Osaka Dental College, was appointed visiting fellow under the Louise C. Ball Fellowship. Dr. John C. Henderson of the resident staff spent his elective research period in electron microscopy with Professor Councilman Morgan, and Dr. Giuseppe Andres, assistant in pathology, University of Rome, worked for several months with Professor Beatrice C. Seegal on experimental glomerulonephritis. Two medical students, Mr. Henry Metzger and Miss Ruth E. Seiden, also worked with Professor Seegal during free time in their fourth

year. Dr. Robert P. Burns of the resident staff carried on studies of the tissue culture of viruses, in collaboration with Professor Calderon Howe, which led to isolation of the virus of cytomegalic inclusion disease and the electron microscopic demonstration of its internal structure by Dr. Henderson. Mr. Richard Neuberger, a member of the third-year class in the School of Dental and Oral Surgery, engaged in research under the supervision of Dr. Solon A. Ellison, studying the organic constituents of enamel and dentin and their degradation by enzymes of oral bacteria. Six graduate students were in residence during the year, one of whom completed requirements and was awarded the Ph.D. degree.

The summary of investigative work by Professor Elvin A. Kabat, which is being carried out in the immunochemical laboratories of the Neurological Institute jointly under the Departments of Microbiology and Neurology, will be found in the report of the latter department. Professor Kabat attended the Ciba Conference on Mucopolysaccharides and gave lectures in England at London Hospital and the University of Leeds, in France at the Pasteur Institute, and in Sweden at the University of Lund and the Institute of Biochemistry, Uppsala, as well as before a combined meeting of the Swedish Bacteriological Society and the Wenner-Grens Institute.

Professor Harry M. Rose continued field studies at Fort Dix under the Commission on Influenza, Armed Forces Epidemiological Board, concerning the protective effect of experimental vaccines against influenza and adenovirus infections of the respiratory tract. Professor Rose was elected president of the New York Section of the Society for Experimental Biology and Medicine.

Professor Claus W. Jungeblut continued the investigation of a hemagglutinin present in the stools of poliomyelitis patients and in the feces of mice naturally infected with Theiler virus. In association with Dr. Helen Kodza, a systematic study was carried out of the growth requirements of viruses of the Col SK group in various tissue culture substrates.

Professor Seegal and Dr. Konrad C. Hsu, in association with Professor Margaret Bevans of the Department of Pathology, continued their studies of nephritis produced by antisera to rat tissues. In association with Professor Forrest E. Kendall, antisera to human serum beta-lipoprotein were used to look for the presence of this antigen in human atherosclerotic vessels.

Professor Dan H. Moore, in collaboration with Dr. Etienne Lasfargues, continued studies of the mouse mammary milk agent. The ultrastructure of normal, malignant, and agent-inoculated mammary tissue cultures grown *in vitro* were compared. Methods for improving the preservation of fine structure of tissues embedded for electron microscopy were investigated and new procedures were applied also to the study of muscle and kidney tissues, as well as to a study of the nature of capillary wall permeability. In October, 1956, Professor Moore attended the First Regional Conference on Electron-Microscopy in Asia and Oceania, which was held in Tokyo.

Professor Howe extended his studies of the enzymic action of influenza viruses. Different capacities of soluble mucoids to inhibit viral hemagglutination were correlated with the release of diffusible sialic acid from these substrates by the action of infective virus. Electrophoretic methods were applied to separate viral inhibitory activity and blood group substance in sputum mucoid; and partial purification of the antiviral activity was achieved.

In collaboration with Professor Rose and Professor Morgan, electron microscopic studies of animal viruses grown in tissue culture were continued. Besides further investigation of different types of adenovirus, the studies were extended to include poliomyelitis, Coxsackie, and Western equine encephalomyelitis viruses in several different human cell lines, among which normal human amnion cells proved useful. Virus isolation studies were continued as part of the Influenza Commission study at Fort Dix. In collaboration with Professor Kabat and Dr. Gerald Schiffman, studies on the dialyzable products of enzymic action on soluble blood group substances were continued, with particular reference to the structural basis of blood group antigen specificity.

Professor Bernard F. Erlanger continued his work on synthesis and testing of decapeptides related to gramicidin S as part of a program to determine the structural characteristics responsible for the activity of this antibiotic. Studies were undertaken to investigate the nature of the "active site" of chymotrypsin by means of this enzyme's interaction with "insoluble substrates." In collaboration with Professor Sam M. Beiser, Professor Seymour Lieberman of the Department of Obstetrics and Gynecology, and Professor Frederick J. Agate, Jr., of the Department of Anatomy, a study of the chemical, immunochemical, and endocrinological properties of steroid-protein conjugates was continued.

Professor Morgan continued his investigation of viral structure and development by electron microscopy. An extensive correlative study of sections stained by histochemical methods and of contiguous sections examined in the electron microscope was undertaken with Professor Gabriel C. Godman of the Department of Orthopedic Surgery.

Professor Beiser investigated the fractionation of pneumococcal transforming DNA by ion-exchange chromatography in collaboration with Dr. Aaron Bendich and Dr. Herbert Pahl of the Sloan-Kettering Institute.

The effect of ultraviolet light on pneumococcus, *Hemophilus*, and their respective transforming factors was studied in collaboration with Dr. Ellison. Professor Stuart W. Tanenbaum collaborated in a study of a comparison of the structural specificity of inducers of an enzyme, protocatechuic acid oxidase, with the specificity of these inducers in their reactions with antiserum.

Professor Tanenbaum investigated the biosynthesis of patulin by *Penicillium urticae*. Considerable progress was made in elucidating the sequen-

tial pathway between aromatic acids and the pyrone. A number of new intermediates were isolated and identified in collaboration with Dr. Emmett W. Bassett. The biosynthesis of stipitatic acid by *Penicillium stipitatum* and the interrelationship between this novel seven-membered aromatic ring system and the C₆ aromatic amino acids was studied. Work was continued on terminal oxidative and energy yielding reactions in the bacterium *Acetobacter peroxidans*.

Dr. Ellison pursued his previous work on the relation between catalase activity and photoreactivability of various bacterial species. Further data were assembled concerning the relation of other enzymes, particularly those involved in terminal respiratory cycles, to the reversal of the lethal and mutagenic effects of ultraviolet radiation by light and chemicals. Investigation of the ultraviolet inactivation of pneumococcus, *Hemophilus*, and DNA derived from these and possessing transforming activity was carried out in collaboration with Professor Beiser. Dr. Paul A. Mashimo studied proteolytic enzymes formed by oral bacteria. Bacterial filtrates are being fractionated in the hope of separating the various enzymes and the activity of these enzymes upon teeth and tooth products is being determined by chemical and histochemical techniques.

Dr. Margaret Holden extended her investigation of the effect of adrenocortical steroids on cells in vitro. Hydrocortisone was observed to enhance vaccinia viral infection in fibroblasts and studies were carried out concerning the time of maximal viral multiplication, as well as the time and rate of viral attachment to hydrocortisone-treated and untreated cells. In association with Professor Seegal, the fluorescent antibody technique was used to visualize the presence of virus in cells. This work is being extended to include a study of the behavior of herpes simplex virus and the adenovirus group, in representative epithelial cell cultures.

Dr. Alice W. Knox carried out extensive laboratory studies concerning the primary isolation of viruses from cases of acute respiratory infection in the influenza study program at Fort Dix, as well as examining the serologic responses of patients to influenza and adenovirus antigens. She investigated an extensive outbreak of acute gastroenteritis in Babies Hospital, which apparently was caused by a viral agent, and collaborated in a study of the possible viral etiology of acute mesenteric lymphadenitis.

The laboratories of the diagnostic service performed 69,306 examinations, of which 28,916 were serologic tests for syphilis.

DEPARTMENT OF NEUROLOGICAL SURGERY

Professor J. LAWRENCE POOL, Executive Officer

The active educational program of the department has continued. Numerous formal lectures have been given to medical students, student nurses,

house staff, and members of other departments. In addition, there has been a heavy program of informal teaching on the wards, in the clinic, in the operating rooms, and in conferences.

The direction of research projects in the department since 1949 has been motivated solely by the desire to solve major clinical problems faced by the neurosurgeon. Each of the various studies now in progress, therefore, represents the latest in a succession of steps having an ultimate clinical goal. Seven problems of major importance are as follows: the treatment of primary malignant brain tumors, the treatment of mental illness, the treatment of circulatory disturbances of the brain, the improvement of defective neurogenic control of the urinary bladder, the regeneration of peripheral nerves and the spinal cord, the treatment of tremor and rigidity associated with Parkinson's diseases and allied conditions, and the investigation of the causes and treatment of peripheral neuritis.

Research on malignant gliomas has been carried out at several levels. Professor Margaret R. Murray of the Department of Anatomy has studied the effects of chemotherapeutic agents on the growth of glioblastoma in tissue culture. Dr. Frederick Boykin and Professor J. Lawrence Pool have continued their studies of the administration of these agents to laboratory animals. Dr. James W. Correll has been investigating hormonal influences on the growth of glial tumors in laboratory animals. Dr. Thomas J. Bridges has developed a technique whereby chemotherapeutic agents can be administered by continuous intracarotid infusion over a period of several days. Professor Joseph Ransohoff, in collaboration with Professor Alfred Gellhorn of the Department of Medicine, has been investigating the clinical usefulness of some of the newer antitumor drugs.

Another aspect of this problem concerns a study of radioactive substances capable of effective concentration in glial tumors. To this end, Professor Edward B. Schlesinger, in collaboration with Professors Edith H. Quimby and Harald H. Rossi of the Department of Radiology, is devoting considerable time and effort with the help of a qualified physical chemist, Dr. Halford R. Clark.

The treatment of mental illness by brain surgery has stimulated careful electrophysiological and pharmacological studies by several members of the staff. Professor Dominick P. Purpura has been actively engaged in studying basic functions of the brain, seeking a clearer understanding of various complex components or circuits of the cortical gray matter which might make possible investigation of the action of critical drugs on some of these circuits. More specifically he has studied the effect of amino acids topically applied to the surface of the brain and the relation between dendritic responses of the gray matter and the complexity of the carbon atom chain of the applied amino acids.

Dr. Edgar M. Housepian of the resident staff has participated in these studies during his period of assigned laboratory work. Dr. Heinrich B.

Waelsch, professor of biochemistry assigned to psychiatry, is cooperating with Professor Purpura in the present amino acid study.

Professor Ransohoff, in collaboration with Dr. Murray Glusman of the Department of Psychiatry and Professor Sidney C. Werner of the Department of Medicine, is studying the effects of discrete hypothalamic stimulation by implanted electrodes on behavioral and endocrine changes in experimental animals. Professor Ransohoff and Dr. Glusman are also investigating conditioning responses in cats wherein half the brain is conditioned to visual stimuli after section of the optic chiasm and corpus callosum.

The ultimate practical outcome of this type of research, that might be called biochemical neurongraphy, could well be the discovery of a predictable, systematic table of drug specificity for different components or circuits of the brain. This could obviously lead to more effective chemical or drug treatment of various types of mental illnesses as well as epilepsy, tremor states, and the like, in conjunction with, or independently of, brain surgery for these conditions.

The circulation of the brain is being studied with an immediate view to more successful treatment of intracranial aneurysms and a long-range view to other disturbances of the cerebral circulation. Channels of collateral circulation of the brain, for example, have recently been described by Professor Lester A. Mount. With Dr. Charles E. Brackett he has also recorded the effects of pressure changes in the cerebral arteries following partial or complete ligation of the carotid artery in the neck. More recently the use of hypothermia for intracranial aneurysm surgery was introduced to the Neurological Institute by Professor Pool and numerous observations made of cardiac arrhythmias induced by stimulation of the CNS.

Ancillary laboratory studies showed how cardiac irregularities of central origin could be produced and then prevented by adequate anesthetic blocking agents acting centrally or peripherally. Dr. Hubert L. Rosomoff of the resident staff, and Professor Duncan Holaday of the Department of Anesthesiology have studied the effects of hypothermia on the neurological complications which follow ligation of the middle cerebral artery in dogs.

Dr. John N. Potanos of the resident staff is making clinical and laboratory studies of the effect of hypothermia on the clotting mechanism which have led to the beneficial administration of heparin in several postoperative patients. Dr. Housepian has made a thorough survey of all aneurysms coming to autopsy examination at the Presbyterian Hospital since 1914.

Dr. Sherwood A. Jacobson is investigating the efficacy and safety of the production of hypothermia by cooling the inhaled gases. With Professor Pool he has initiated a laboratory investigation of factors involved in the production of spasm of cerebral arteries and with Dr. Bridges is seeking a technique for detecting evoked potentials from the nerve supply of arterial walls.

Professor James B. Campbell is completing his study of several years' duration on the innervation of the urinary bladder. This study has already

led to helpful clinical application carried out in cooperation with Professor John K. Lattimer and other members of the Department of Urology. Dr. R. James Seymour of the resident staff participated in this work in the laboratory and is continuing a separate related study involving microscopic studies of the cell stations and fiber pathways dealing with bladder innervation in the lower portion of the spinal cord and in the hypogastric ganglia.

Professor Campbell and his collaborators investigated the ability of a new substance, millipore, to speed the regeneration of peripheral nerves. Dr. C. Andrew L. Bassett of the Department of Orthopedic Surgery is a collaborator in this work. Dr. Jorgen Therkelsen and Professor Pool have recently described the effective use of nerve grafts which have been stored in Simm's solution, at the suggestion of Professor Ralph A. Deterling, Jr., of the Department of Surgery.

Treatment of tremor and rigidity associated with Parkinson's diseases is being pursued at both the clinical and laboratory levels. Dr. Housepian has made several valuable technical contributions in the form of a special cassette holder for x-ray films, a manipulator for simple but accurate insertion of an instrument into the globus pallidus and a chart showing the location of the globus pallidus in relation to the anterior commissure. These have greatly facilitated accurate placement of lesions in the internal portion of the globus pallidus. Professor Campbell plans clinical application of his technique for creating radioactively induced lesions in the globus pallidus for the treatment of Parkinson's disease. In the laboratory Professor Purpura is studying pallidothalamic connections by electronic means. Drs. Housepian and Girado have participated in this study.

Dr. James W. Correll, in collaboration with Dr. Howard J. Tucker of the Department of Neurology, has been actively engaged in both clinical and experimental studies of the causes and treatment of peripheral neuritis. Dr. Correll is investigating the alteration in fat metabolism produced by certain lesions of the central nervous system.

Dr. Seymour is utilizing new staining techniques for the study of biopsy specimens of nerves from certain cases of peripheral neuritis.

Professor Pool has been particularly interested in improving the technique of pallidal surgery for the treatment of Parkinson's disease and in collaboration with Dr. Housepian has now done over thirty operations of this kind with encouraging results. He has continued his interest in cardiac effects of central origin including observations of this type in the operating room and in the neurosurgical laboratories, the latter in conjunction with Drs. Jacobson and Housepian, and Professor Purpura. A study of hypophysectomy for the treatment of advanced mammary carcinoma has also been pursued with Professor Joseph W. Jailer of the Department of Medicine, Professor David V. Habib of the Department of Surgery, and Professor Morton M. Kligerman of the Department of Radiology.

Professor John E. Scarff carried out a careful follow-up investigation of

all patients treated by him for relief of communicating hydrocephalus by means of endoscopic cauterization of the choroid plexuses. He has also collected case histories of twenty-six patients who had surgical interruption of the superior cerebral veins for the treatment of epilepsy.

Professor Fritz Cramer, assisted by Dr. Correll, has turned his clinical research endeavors to problems of the spinal cord with particular interest in ossification of the leptomeninges and lesions of the cervical intervertebral discs co-existing with tumors.

Professor Schlesinger has continued his investigation of the enhancement of uptake of radioactive tagged carriers in localization of tumors of the central nervous system and has also studied the effect of muscle relaxants.

Professor Lester A. Mount has been active in several research projects, namely, a continued study of aneurysms and acute subarachnoid hemorrhage, arteriographic study of collateral circulation of the brain, a long-term study of the results of operative therapy for premature synostosis of the sutures of the cranial wall; complications of ventricular drainage associated with epidural hemorrhage with Drs. Harold Haft and Henry R. Liss of the resident staff, a study of pituitary adenomas and intracranial aneurysms with Dr. Haft, and investigation of hemorrhagic diathesis secondary to thorotrast angiography, carried out with Dr. Haft and Dr. Stuart W. Cosgriff of the Department of Medicine.

In addition to the previously mentioned investigations, Professor Ransohoff has studied certain types of unilateral headache and atypical facial pain as well as trigeminal neuralgia in collaboration with Professor Emanuel M. Papper of the Department of Anesthesiology and Professor Arnold P. Friedman of the Department of Neurology. Together with Professor Sidney Carter and Melvin D. Yahr of the Department of Neurology, he has continued the treatment of uncontrollable seizures in infantile hemiplegia by hemispherectomy. With Professor Campbell he has pursued the treatment of hydrocephalus by shunting procedures and with Dr. Robert A. Fishman of the Department of Neurology he has studied the circulation of the cerebrospinal fluid in hydrocephalus by radioactive "tagging" techniques.

With Dr. Liss, Dr. Bridges has studied saline lobotomy for relief of pain in patients with advanced cancer, while his plethysmographic technique for observations of the cerebral circulation with Professor Yahr has been completed. He has also carried on investigations of brain temperatures with Professor Frederic J. Agate of the Department of Anatomy and endocrinological studies of hypophysectomy for prostatic and breast carcinoma with Dr. Charles E. Crandall, Jr., of the Department of Medicine and Professor Perry B. Hudson of the Department of Urology. Professor Campbell, in addition to the research studies previously mentioned, has been active in formulating a technique for stereotaxic placement of radioactive material for the production of quantitative lesions in the brains of animals.

Dr. Edward C. Ryan, a resident, has completed a careful study of intracerebral hematomas.

Dr. Liss, with Professor William F. Caveness of the Department of Neurology, is completing a follow-up survey of 490 Marine and Navy personnel who sustained head injuries during the Korean campaign, in which he participated. His other interests include electrode implantations into the spinal cords of primates and thermistor implantations into the spinal cords of primates, with Professor Agate of the Department of Anatomy and Mr. Waller Morgan of the Department of Neurology; implantation of electrodes into the periaqueductal gray matter of monkeys by stereotaxic means prior to studying concussion effects by electroencephalography with Professor Caveness and Dr. Leon Roizin of the Department of Pathology; and injection lobotomy techniques for relief of pain in advanced cancer with Dr. Bridges.

Dr. Kessler has studied cardiac abnormalities induced by intracranial surgery and their relation to anesthesia and hypothermia, with Professor Pool; and postoperative spinal fluid examinations to establish expected variations relative to intracranial surgery, with Dr. Ralph A. Olson of the resident staff and Dr. Potanos. Evaluation of surgery of herniated nucleus pulposus at the lumbar level with particular reference to the efficacy of fusion and its attendant complications, and evaluation of the treatment of pituitary adenomas by surgery and radiation, are part of cooperative studies.

Dr. Potanos is carrying out the following studies: a survey of metastatic neoplasia with reference to the central nervous system at Presbyterian Hospital from 1925 through 1955; determination of the clinical range of cerebrospinal fluid changes postoperatively; applicability of hypertonic urea solutions in reduction of cerebrospinal fluid pressure; and respiration and glycolysis of cerebral tissue as related to specific cellular components.

Dr. Seymour has been active in the establishment of a histological laboratory equipped for selective silver impregnation techniques in the peripheral nervous system, and his study of the sites of origin of the sacral autonomic outflow is continuing.

In addition to his studies of the effects of hypothermia, Dr. Rosomoff has been interested in cranial reconstruction with "anorganic" bone and the repair of dural defects with freeze-dried dura mater.

DEPARTMENT OF NEUROLOGY

Professor H. HOUSTON MERRITT, Executive Officer

The teaching activities of the department continued at their previous high level. In addition to the regular courses in clinical neurology, members of the department assisted in the laboratory exercises and gave lectures in the courses of neuroanatomy and neuropathology. The department directed the clinical training in neurology at the Neurological Institute of fifteen residents and seven fellows assigned by the United States Public Health Service

or other agencies. In addition, postgraduate courses for practicing physicians were given at the Montefiore and Mount Sinai Hospitals.

The research activity of the department continues to expand. Professor Fred A. Mettler has completed studies on the rubrospinal tract, the olivary decussation, and brachium conjunctivum as well as studies on the experimental production of ataxia. Professor Mettler's James Arthur Lecture entitled "Culture and the Structural Evaluation of the Neural System," was issued by the American Museum of Natural History in 1956 as the first of this series to be published on the evaluation of the human brain. He also gave a lecture before the Association of American Law Schools on "Intent." Professor Mettler has resumed his studies on the history of medicine with a publication in the July, 1956, *Bulletin of the Medical Library Association* on medieval Islamic medicine.

Professor Mettler and Mr. Robert L. Thompson in association with Dr. Christian A. Hovde of Seton Hall Medical College, have studied how the retention of learned patterns of behavior is influenced by damage to the striatum. During the current year Professor Mettler's researches upon the corpus striatum have also been extended in another direction, notably the analysis of the pathologic physiology of paralysis agitans.

Dr. Stanley G. Penny, who has been associated with Professor Mettler in a program of research on the spinal cord, has been elected president of the New York City Veterinary Association. Dr. Juan Gomez, who is collaborating with Professor Mettler in his researches on the corpus striatum, has been elected president of the Latin American Medical Students Association.

Electrophysiological studies of cultured chick embryo spinal ganglion cells by Dr. Stanley M. Crain were greatly facilitated by the development of a culture technique which permits the long-term maintenance of these neurons in a cellulose framework following early outgrowth in a plasma clot. A system was also devised for rapid alteration of the chemical environment of the hanging-drop culture during intracellular recording, and has been used in preliminary pharmacological investigations. Action potentials in response to electrical stimuli were recorded (extracellularly) from explants of bullfrog tadpole medulla, retina, and forebrain, after periods up to four weeks in vitro.

Professor Harry Grundfest's major activity has centered about the hypothesis put forward in 1954 that synaptic transmission differs in a fundamental electrophysiological respect from propagation of impulses along nerve fibers. Various consequences of this hypothesis have been explored both in Professor Grundfest's laboratory and elsewhere. Studies on the synaptic organization and pharmacology of the mammalian central nervous system have been continued by Professors Grundfest and Martin Girado in collaboration with Professor Dominick Purpura and Dr. Edgar M. Housepian of the Department of Neurological Surgery. Recent work concerns the analysis of the modes of synaptic action of various amino acids and related compounds.

Under Professor Grundfest and Dr. C. Y. Kao of the Rockefeller Institute for Medical Research studies have been conducted on segmented giant axons of earthworm and crayfish. Further studies are continuing with Dr. Crain, who has received a Grass Foundation Fellowship to pursue this work with Professor Grundfest at the Marine Biological Laboratory, Woods Hole, Massachusetts.

The nature of the synaptic activity which is responsible for repetitive rhythmic discharges in various electric fishes has been studied further by Professor Grundfest and Professor Alexander Mauro of the Department of Physiology, Yale University Medical School, and Mr. Ernest Amatniek, engineer-biophysicist. Some fifteen species of Gymnotidae and about thirty of the Mormyridae have been characterized with respect to the discharges and some of their properties. Professor Grundfest and Dr. Crain are also studying the electrical activity of the African electric catfish, *Malapterurus electricus*. A stay at the Marineland Research Laboratory by Professor Grundfest, Professor Mauro, Mr. Amatniek, and Mr. Robert Mathewson, Curator of Science, Staten Island Institute of Arts and Sciences, permitted studies of two other forms: the *Torpedo narcine brasiliensis* and the star-gazer, *Astroscopus guttaters*, neither of which had previously been studied with modern electrophysiological techniques.

Professor Grundfest has continued a fruitful collaboration with Professors Joseph Fiasconaro and Harold Sherman of the Department of Dental and Oral Surgery, on the evaluation of the activity of dental anesthetics. Another collaborative research, with Drs. Abraham M. Shanes and Walter Freygang, Jr., of the National Institutes of Health, concerns the ionic phenomena during the action potential of squid giant axons.

Professor David Nachmansohn and his group continued their work on biochemical aspects of nerve function, with special emphasis on the elementary process underlying the generation of bioelectric currents and the chemical reactions controlling ion movements.

The single electroplax preparation initiated last year has been modified and greatly improved by Dr. Ernest Schoffeniels. The development of a specific and potent antidote—pyridine aldoxime methiodide (PAM)—against alkylphosphate intoxication has shown the usefulness of the study of the molecular forces acting in the acetylcholine system. The antidote was designed by Professor Irvin B. Wilson on purely theoretical considerations with the aim of repairing the chemical lesion which results from the phosphorylation of acetylcholinesterase. Professor Wilson, in association with Dr. Sara Ginsburg, investigated the steric configuration of PAM. A number of PAM analogues were synthesized which may be useful for special studies in isolated cells and tissues. Professor Wilson also continued studies of the molecular forces acting between the enzyme protein and small molecules.

New and interesting information was obtained in this respect by the use of tensilon and its analogues.

Dr. Claire Lawler continued to develop new methods of purification of acetylcholinesterase from the electric organ of electric eels. The properties of the protein are under study using electrophoresis and ultracentrifugation.

Dr. Frank Hoskin continues studies initiated by Professor Max Eisenberg of the Department of Biochemistry, on the intermediary metabolism of the electroplax. The presence of various enzymes of the glycolytic and citric acid cycle and their concentration is being investigated. The investigation will be carried out in correlation with the studies on the single electroplax preparation.

Dr. Annemarie Weber investigated the question of whether ATP breakdown can be demonstrated during contraction in an intact muscle fiber. The work was carried out with the spectrophotometric methods developed by Professor Britton Chance, director of the Johnson Foundation at the University of Pennsylvania, and in collaboration with him.

Professor Nachmansohn's group participated actively in the new teaching program in biochemistry for medical students reorganized by Professor David Rittenberg. Professor Nachmansohn gave lectures at Cornell, Yale, and Long Island Universities. He also accepted an invitation of the American Chemical Society to lecture to various local sections. Professor Wilson was invited to lecture at Harvard and the University of Wisconsin.

The training program in neuropathology under a United States Public Health Grant to Professor Abner Wolf was continued with Dr. Sheila Donahue as the senior trainee and Dr. Benjamin Matzilevich as the junior trainee. Dr. Joseph Barbett, Jr., was a fellow in neuropathology for six months and Dr. Jaime Gómez of Bogotá, Colombia, fellow of the Colombian Institute of Technical Specialization Abroad, began his training in February, 1957. Dr. Charles W. True was appointed as a junior trainee on the United States Public Health Service and assigned to the laboratory of Professor Leon Roizin at the New York Psychiatric Hospital. Dr. John Moosy, former fellow in neuropathology, was appointed assistant professor of neuropathology at the Louisiana State University on July 1, 1957. During the past year Professor Wolf has been president of the New York Neurological Society and has served on several governmental committees. Professors Wolf and David Cowen and Dr. Lester M. Geller continued their studies on birth injury of the brain and of the effects of severe repeated convulsions in infancy upon the central nervous system. Professor Wolf reported on changes in the human brain during aging at the Symposium on the Processes of Aging in the Nervous System. Professors Wolf and H. Houston Merritt are reporting on profound coma and brain stem lesions at the First International Congress of Neurological Sciences to be held in Brussels in July, 1957. Dr. Sheila Donahue is studying a unique instance of

xanthogranulomatosis with involvement of the nervous system with Dr. Arthur Brown, resident in pathology. Dr. Edgar Housepian, assistant resident in neurosurgery, while assigned to neuropathology, made a statistical study of congenital aneurysms of the cerebral blood vessels. Dr. Donahue, in collaboration with Professors Alfred Gellhorn of the Department of Medicine and Professor Joseph Ransohoff of the Department of Neurological Surgery has begun a study of primary reticulum cell tumors of the cranial cavity. Professor Wolf has continued his interest in and study of the demyelinating diseases.

The immunochemical laboratories at the Neurological Institute are under the Departments of Microbiology and Neurology. A systematic investigation of the use of quantitative immunochemical technics in the elucidation of the structural units determining reactivity of polysaccharide antipolysaccharide systems is under way. The demonstration in the dextran-antidextran system by Professor Elvin A. Kabat that antidextran molecules are heterogeneous in the size of their combining sites has appeared in the *Journal of Immunology*.

Mr. Peter Z. Allen, a graduate student in microbiology, and Professor Elvin A. Kabat have studied the antigenicity of bacterial polysaccharide levan in man. Mr. Joel Goodman, a graduate student in microbiology, and Professor Kabat have investigated the comparative sizes of antidextran and the antibody-combining site on the Type II antipneumococcal antibody which cross-reacts with dextrans and glycogens. The principles worked out with these simpler systems are being applied to the elucidation of the structural units of the blood group A and B substances which determine their specificity. Dr. Gerald Schiffman of the Department of Microbiology and Professor Kabat are fractionating oligosaccharides obtained by mild acid hydrolysis of the blood group substance. Professor Calderon Howe of the Department of Microbiology, Dr. Gerald Schiffman, Miss Ada E. Bezer, and Professor Kabat are engaged in a study of the effects of enzymes from *Clostridium tertium* in splitting off various constituents from the blood group substances and their effects on blood group activity and cross-reactivity with Type XIV antipneumococcal antibody.

Mr. Allen and Professor Kabat have been studying the nondialyzable polysaccharide residue after mild acid hydrolysis of the A and B substances. These materials were found to possess antigenicity for man. The specificity of these degraded blood groups substances with their antibodies is also under investigation.

Professor Melvin D. Yahr, Miss Ada E. Bezer, and Professor Kabat have prepared a survey of the changes in cerebrospinal fluid gamma globulin in patients with multiple sclerosis followed over long intervals and are attempting to correlate this with the course of the disease.

Dr. Irving Finger and Professor Kabat are studying the precipitin reaction of human diphtheria antitoxin with toxin.

Professor Kabat attended a Ciba Conference on Mucopolysaccharides in London, and delivered lectures at London Hospital, the University of Leeds and the Pasteur Institute in Paris at which he was presented with a silver plaque of Louis Pasteur. In Sweden he also addressed a joint meeting of the Swedish Microbiological Society and the Wenner Grens Institute in Stockholm, the Biochemical Institute at Uppsala, and the Medical Faculty at the University of Lund. He also spoke at the University of California at Berkeley and delivered one of the Nathan Rosenthal Seminars at Mount Sinai Hospital.

Professor Paul F. A. Hoefer, with Dr. Lewis P. Rowland and Dr. Henry Aranow, Jr., of the Department of Medicine, has continued with his studies on myasthenia gravis. A review of cases developing at some time after surgical removal of thymomas was presented by Professor Hoefer at the meeting of the American Academy of Neurology. In an attempt to improve drug treatment of myasthenia gravis, the therapeutic effects of long-acting alkyl-phosphates have been reviewed in some detail. The problem of radiating thymus and thymomas prior to surgical intervention is being studied by a team including Professor Hoefer, Professors William B. Seaman and Morton Kligerman, of the Department of Radiology, Professor Raffaele Lattes of the Department of Pathology, and Professor Robert Wylie of the Department of Surgery.

Professor Hoefer, with Dr. Stanley Lesse and Dr. James Austin of the resident staff, has finished an analysis of cases with a severe diffuse encephalopathy of varying etiology characterized by a highly specific pattern in the electroencephalogram. Other studies by Professor Hoefer include an analysis of focal electroencephalographic abnormalities in cases of classical clinical petit mal epilepsy with Professor Eli S. Goldensohn and Dr. Joseph O'Brien of the resident staff.

A number of graduate students from this country and abroad studied in the electroencephalographic division for varying periods of time.

Professor Eli S. Goldensohn and Dr. Robert Katzman, resident in neurology, are continuing their study on the distribution of direct current potentials in the brain. Professor Goldensohn and Mr. Leonard Zablow have developed an electrical impedance method for recording respiratory patterns which is now ready for use in clinical investigation. Dr. Robert A. Fishman, Dr. Katzman, and Professor Goldensohn have completed a study on glutamic oxalacetic transaminase levels in spinal fluid and serum of patients with various neurological disorders.

Dr. O'Brien and Professor Goldensohn have completed a study on paroxysmal abdominal pain as a manifestation of epilepsy. Professor Goldensohn, Professor Jack Frumin, and Dr. John Schweiss of the Department of Anesthesiology, have completed a study on the electroencephalogram during anesthesia. Professor Goldensohn and Dr. William Hass, assistant resident

in neurology, are investigating the electroencephalographic changes associated with thrombosis of the internal carotid artery.

Professor Goldensohn, Dr. Isabelle Rapin, assistant resident in neurology, and Professor Hoefler, are studying the relationship between electroencephalographic changes during hyperventilation and levels of carbon dioxide measured continuously throughout the respiratory cycle in various age groups.

Professor Goldensohn and Drs. Hass and Elliot Weitzman, of the resident staff are investigating body tilting and carotid compression as methods for activating electroencephalographic abnormalities in cerebrovascular insufficiency. Professor Goldensohn, and Dr. Michael Small of the resident staff are evaluating the electroencephalographic and electrocorticographic findings in patients with intractable seizures treated by hemispherectomy.

Professors Sidney Carter, Melvin D. Yahr, and Daniel Sciarra have continued their clinical investigations of new anticonvulsant drugs. A number of new compounds have been tried. Professor Carter with Professor Joseph Ransohoff of the Department of Neurological Surgery are evaluating a new procedure, chemopallidectomy, in the treatment of abnormal involuntary movements in children with various forms of cerebral palsy.

Professor Carter was the director of a program on pediatric neurology at the American Academy of Neurology held in Boston and has been asked to plan a symposium on this subject for the next meeting of the American Academy of Pediatrics to be held in Chicago in October.

Three of the former fellows in pediatric neurology are now in academic positions at other universities. Dr. Neils Low is associate research professor in pediatrics at the University of Utah; Dr. Patrick Bray is assistant research professor in pediatrics at the University of Utah; and Dr. Richard Allen is instructor in pediatrics at the University of Michigan.

Professor Melvin D. Yahr is participating in the organization of a study of subarachnoid hemorrhage and cerebral aneurysms. This study, in cooperation with the Department of Neurological Surgery, is part of a nationwide program under the auspices of the National Institute of Health. An attempt to evaluate various types of therapy, as well as the natural history of the disease, will be made. Professor Yahr is also studying the effect of the newer carbonic-anhydrase inhibitors on cerebrospinal fluid pressure in patients with increased intracranial pressure. Professor Yahr is Consultant in Neurology, United States Army, First Army Area; consultant to American Medical Association on Pharmacy and Chemistry; and training consultant in Neurology Division of Vocational Rehabilitation, New York State Department of Education.

Professor Joseph Moldaver, with Dr. Philip Knapp of the Department of Ophthalmology and Dr. Julia Schneider of the resident staff, has continued the study of pathology of the extraocular muscles by means of electromyography. A preliminary report of this work was presented at the meeting

of the American Neurological Association on June 20, 1956. Professor Moldaver is also evaluating the electromyographic changes in muscular diseases: dystrophy, polymyositis, and various collagen diseases.

Dr. William Amols has continued his clinical studies of new compounds for the treatment of neurological disorders. Following the successful demonstration of the oral effectiveness of zoxazolamine (flexin) as a skeletal muscle relaxant, four analogues of this compound were carefully studied in spastic patients in the continuing search for a more effective relaxant. Three other chemically unrelated compounds were also evaluated as skeletal muscle relaxants. Dr. Amols has also continued the study of anti-emetic compounds.

Professor William F. Caveness, in association with Dr. Henry R. Liss of the resident staff, continued the follow-up phase of the study of head injuries incurred in Korea by Navy and Marine personnel. In association with Dr. Charles W. True and Mr. William Curlett, the study of head injury was extended into the laboratory where concomitant clinical observations, cortical and brain stem electrical recordings, and histological studies were made subsequent to injury in the rhesus monkey. By such correlation it is hoped there will be a better understanding of head injury in man.

Professor Caveness, in association with Professors Nicholas Kopeloff and Lenore M. Kopeloff of the Department of Microbiology, Dr. Joseph G. Chusid, attending neurologist at St. Vincent's Hospital, and Dr. Gertrude van Wagenen, research associate in obstetrics and gynecology at Yale University School of Medicine, determined the refractability of infant rhesus monkeys to the development of seizures by the injection of alumina cream into the cerebral cortex. Professor Caveness was appointed consultant in neurology to the Surgeon General of the United States Navy.

Dr. Robert A. Fishman has been continuing his studies of the "blood brain barrier" as indicated by the transport time of Na^{24} between plasma and cerebrospinal fluid in dogs. Dr. Fishman has also continued his study in patients of the exchange of protein between plasma and cerebrospinal fluid in collaboration with Professor Ransohoff and Dr. Elliott F. Osserman of the Department of Medicine.

Dr. Lewis J. Doshay has continued his clinical studies of the therapy of Parkinson's disease. Dr. Doshay and Professor Frederic J. Agate, Jr., of the Department of Anatomy, are continuing their work in the development of apparatus for the objective measurement of tremor and rigidity in patients with Parkinson's disease and the effect of medical and surgical therapy on these symptoms.

Research activities of the department at the Montifiore Hospital under the direction of Professor Tiffany Lawyer, Jr., have been chiefly concerned with clinical investigations. Professor Arnold P. Friedman has continued the evaluation of drugs for the treatment of headache and the assessment of the role of vascular factors in headache. He is also studying the patho-

physiology of headache in patients with hypertension. Professor Friedman participated in symposia on headache at several state and national medical society meetings. Professor Moses J. Madonick has been investigating cerebrospinal fluid transaminase levels in patients with diseases of the nervous system. Dr. Seymour Solomon has been evaluating the efficacy of cardrase in the management of patients with convulsive disorders and the value of delayed absorption preparations in the treatment of myasthenia gravis. Dr. Solomon has been surveying the hazards of pneumoencephalography in patients with cerebral vascular disease.

Professor Merritt was chairman of the Program Planning Committee of the Council of the National Institute of Neurological Diseases and Blindness of the United States Public Health Service. This Council is responsible for the planning of the Intramural Program of the Institute and the awarding of funds for research and training in neurology. Professor Merritt was president of the American Neurological Association and chairman of the Fellowship Committees of the National Multiple Sclerosis Society and the National Foundation for Infantile Paralysis. He was also chairman of the Medical Professional Advisory Board of the United Cerebral Palsy Association.

Visitors to the department during the past year included Professor Raymond Garcin, Paris; Professor E. Arnold Carmichael, London; Professor Georges Boudin, Paris; Professor Ynge Zotterman, Stockholm; Professor Gunner Wohlfart, Lund; Professor J. Godwin Greenfield, London; Professor Hans Hoff, Vienna; and Sir Russell Brain, London.

We announce with regret the death of the following members of our department: Professor Emeritus S. Phillip Goodhart; Assistant Professor Leon Salmon; and Dr. Maurice Frocht, associate in neurology (retired).

DEPARTMENT OF NURSING

Professor ELEANOR LEE, Executive Officer

All of the students registered in September, 1956, are candidates for the Bachelor of Science degree from Columbia University as well as for the diploma for the first time in the history of the school. The expanded enrollment of degree students is significant and the increased number of applications for next September indicates that more college students are being attracted to the nursing program of the Department of Nursing. The registration figure for September, 1956, shows a 20 percent increase in student enrollment over the 1946 registration. One hundred and thirty-one new students were registered, 16 percent of whom were college graduates, a marked increase over recent years. Those admitted to the school represent 62 percent of the total applicants for this class. The attrition rate for the three classes enrolled at present (1957-1959) is 10 percent as compared to

the national rate of 33 percent. During the period 1940-1957 a total of 2,314 students have been enrolled in the Department of Nursing and the attrition rate is 17.8 percent.

Scholarship aid was given during this year to ninety students or 25 percent of the students enrolled. The Louise and Gustavus Pfeiffer Foundation has provided tuition scholarships for thirty-seven students this year. An additional gift was received in April, 1957, to continue the ten full-tuition and ten half-tuition scholarships for the Class of 1960 entering next September. The income from the Vivian B. Allen Foundation Scholarship was given to six students in the Classes of 1957 and 1958. Ten scholarships were given by the Alumnae Association of the Presbyterian Hospital School of Nursing. The Dean Sage Memorial Scholarship was awarded to a member of the Class of 1959 and provides full tuition. The Mary Sencindiver Specht Scholarship was awarded to a student in the Class of 1958. The Jane McAllister Scholarship was awarded to a member of the Class of 1957. The Greer Scholarship Fund, through the kindness of Mrs. S. Hazard Gillespie, Jr., has provided a scholarship for this year and also partial tuition for next September. The Margaret E. Conrad Scholarship was awarded to a member of the Class of 1959. The Helen O'Rourke Hughes Memorial Scholarship and the Friendly Shop Scholarship, donated in 1954 to the Columbia University Bicentennial Fund, were awarded this year.

A total of twenty students received scholarship aid from the Special Scholarship Fund. The Columbia University Committee for Community Service has contributed funds during this year from the proceeds of its Thrift Shop. The Mother's Club of Maxwell Hall donated funds which were awarded to five students in the Classes of 1958 and 1959. The Women's Florist Association in May, 1957, contributed a scholarship which was awarded to a member of the Class of 1959. Other scholarships from outside sources were a New York State Scholarship, the Lersner Scholarship, and the New Britain Society (Connecticut) Scholarship.

Miss Esther M. Glad was promoted to associate on July 1 and assumed the responsibility for the teaching of nursing to the first-year students; she replaced Miss Angela Del Vecchio who resigned. Mrs. Harriet B. Woodruff and Miss Barbara C. Hanaford were appointed instructors in nursing to assist with the teaching of nursing to the first-year students both in the classroom and in the clinical area on the general medical and surgical services. They replaced Miss Josephine C. Brown and Miss Ruth A. Lynch, who resigned.

Other changes in the medical and surgical units were Miss Evelyn M. Dries, instructor, replacing Miss Rose M. Hoynak, and Miss Marjorie Porter, instructor, replacing Miss Kathlyn Y. Egan. Miss Constance Callahan was appointed instructor assigned to pediatrics, replacing Miss Mary Mau, who resigned. Two additional instructors, Miss Faith Whiting and Miss Audrey M. Hildebrand, were appointed to improve the clinical teach-

ing of pediatric nursing to students on evening and night duty. Miss Dolores C. Farrell, instructor assigned to pediatrics, was awarded a Children's Bureau Scholarship by the New York State Department of Health for the study of pediatric nursing and received a Master's degree. Upon her return from her leave of absence, Miss Farrell will assist in a new program of coordinating the teaching of pediatrics with maternity and orthopedics. Miss Grace E. Laubach substituted for Miss Farrell.

Miss Beatrice M. Dorbacker, instructor in nursing, was awarded a scholarship and granted a leave for the spring session at Teachers College; she received a Master's degree in June, 1957.

Mrs. Bertha Unger was appointed an instructor in nursing assigned to the Neurological Service, replacing Mrs. Helen C. Delabarre, who resigned. During this year a new program of four weeks' instruction and experience in neurologic nursing has proved most successful, replacing the former eight weeks' program.

Miss Barbara A. Simpson was appointed instructor in nursing assigned to the orthopedic service, replacing Miss Esther M. Glad. The four weeks' program in orthopedic nursing, which includes planned observations in the orthopedic clinic of the outpatient department enables the senior student to participate in rehabilitation and teaching of the patient as a member of the team of experts representing the various health professions.

Miss Constance C. Hamon, assistant professor of nursing, was awarded a traineeship for graduate study from the United States Department of Health Education and Welfare in September and was granted a leave of absence for the academic year; she received her A.M. degree from New York University in June, 1957. Upon her return, Professor Hamon was given a new position with dual responsibilities in the outpatient department with an appointment as assistant director of nursing service.

Miss Estelle Guidice, instructor in nursing assigned to the outpatient department, was awarded a traineeship for graduate study from the United States Public Health Service in January and was granted a leave of absence for study at Teacher's College Division of Nursing Education for the spring term; she received her A.M. degree in June, 1957. Miss Guidice will return July first as instructor for the student nurses in the outpatient department.

Mrs. Emma MacChesney Cugle was appointed instructor on February first to replace Miss Guidice during the spring session. Mrs. Cugle will continue as a member of the faculty on a special study of public health nursing.

In 1946 Miss Hamon developed the Outpatient Nursing Service of the Presbyterian Hospital as an educational experience in public health nursing for students of the Department of Nursing. This program was closely coordinated with and offered as part of the student's experience in the outpatient department. This program was discontinued in October, 1956,

when field experience was available through the Bureau of Public Health Nursing, New York City Department of Health.

During the past two years Miss Guidice has been the field instructor for groups of four students having experience in the Outpatient Nursing Service. During the fall term Miss Guidice coordinated the program between the Department of Nursing and the Bureau of Public Health Nursing, New York City Department of Health, and developed the seminar offered concurrently with that experience.

The public health content including public health nursing field experience as an integral part of the total curriculum has been the major area of study during this year. The need for each student in a basic collegiate program to be offered specific experience with a health agency seems to be generally accepted. Arrangements were made for a total of eighty-eight senior students to have eight weeks' public health nursing field experience as follows: Visiting Nurse Association of Brooklyn, Visiting Nurse Service of New York, and the Bureau of Public Health Nursing, New York City Department of Health. A weekly seminar in public health nursing with emphasis on family and community health education was held concurrently with field experience for the four groups of eight students each assigned to the Bureau of Public Health Nursing. In addition an all day conference for each of the four groups of eight students for presentation of family studies was attended jointly by members of the staff of the Bureau of Public Health Nursing concerned with the student program and by faculty members of the Department of Nursing. This new program with the Bureau of Public Health Nursing started in October, 1956, was made possible through the generous effort of Professor Ray E. Trussell of the School of Public Health and Administrative Medicine.

Twenty senior students in two groups of ten each had the opportunity of eight weeks' instruction and experience in rural nursing at the Mary Imogene Bassett Hospital in Cooperstown from February through May.

A training grant under the National Mental Health Act, Department of Health, Education and Welfare, Public Health Service, National Institutes of Health was awarded to the Department of Nursing in August for the academic year 1956-1957.

Miss Millicent Tschaepé was appointed instructor in nursing on January 15, 1957, assigned to the research study of mental health in the curriculum. Miss Tschaepé has been working with the faculty in evaluating and improving the mental health content in the first-year program.

On June 1, Miss Anna M. McQuade joined the faculty as assistant professor of nursing. Miss McQuade will direct the research on mental health in the curriculum and coordinate this study with the proposed study of public health.

Included in the survey course in nursing are fifteen hours of mental

health content and in medical and surgical nursing thirty hours related to mental health and sixty hours of group discussion concerned with adjustment to nursing, nurse-patient relationships, and special problems of patients. For several years a subcommittee of the curriculum committee has been studying the content and experience related to human relations that should be offered to a student of basic professional nursing to prepare her to give comprehensive patient care. The mental health data have been tabulated for each clinical area. A group of faculty members have been studying the interrelatedness of maternity, pediatrics, and orthopedics with the major emphasis in pediatrics on growth and development and in maternity on the family unit and parent education.

The three-year study of learning experiences related to medical and surgical nursing under a grant from the China Medical Board, Incorporated, has been completed and prepared for publication by Professor Dorothy E. Reilly under the title of "The Curriculum through the Students' Eyes." In the revision of the first-year curriculum this year the content and experiences have been improved, due in large measure to the data obtained from this research.

The new program of four major courses for the first nine months has been completed successfully by 125 students in the Class of 1959. The basic science course is designed to promote understanding of the normal structure and function of the body and the factors underlying the promotion and maintenance of health. The content of anatomy and physiology, chemistry microbiology, and nutrition is integrated. During this period the survey course in nursing placed special emphasis on emotional and physical health, the significance of illness for the individual, his family, and the community. The meaning and the responsibilities of the profession of nursing are also included. Supervised practice in the medical and surgical services eight hours per week with clinical instruction was planned concurrently.

The course in medical and surgical nursing began in the second quarter of the winter session and continued through the spring session. The content was developed around selected problems in nursing care related to patients with medical and surgical conditions with total patient care the important factor. The basic sciences are integrated and emphasis placed on mental health, public health, patient teaching, and rehabilitation. Clinical assignments on the four teaching services were arranged for each student with planned clinical teaching and observations in the admitting clinic and the recovery room. The members of the several departments of the Faculty of Medicine participating in this new program have shown great interest and have contributed valuable teaching.

The core content for the second-year students was presented in two courses, modern social problems and patient teaching, to four groups of thirty students each from the Class of 1958 and one group in June of thirty students in the Class of 1959. Throughout her nursing education the student

is encouraged and provided the opportunity to become aware of the social and health needs of the community. This content concerned with the social environment emphasized care of the patient with long-term illness, drug addiction, alcoholism, and various aspects of rehabilitation. Observation visits to community agencies and specialized hospitals were included in this program. The course in the teaching of patients included concepts of teaching and learning and also experience in teaching in the clinical situation. Experts from many community agencies contributed to this program. Closer coordination of learning in the inpatient and outpatient services has been gained in certain areas.

The course *Sociology-Nursing 95* given in the third year of the nursing curriculum included a six-hour unit on the role of the nurse in community disaster. This content was presented in three two-hour sessions. Dr. Michael Antell, director of District Health Service, New York City Department of Health, presented the public health aspects of community disaster in which he briefly explained the Civil Defense Program in New York City and exemplified the work of the United States Public Health Service by discussing the 1955 Connecticut Flood Disaster. Dr. Joseph Schachter of the Department of Psychiatry followed this by a discussion of psychological first aid. He emphasized the individual's response in a disaster situation as well as mass panic reactions. The role of the Columbia-Presbyterian Medical Center in response to a community disaster was presented by a panel composed of members of the Emergency Committee.

In the third year of the program opportunity is provided for the student to apply her accumulated learning in more complicated medical and surgical situations. During this eight weeks' senior experience the student develops and carries out a teaching project with a first-year student on the same clinical service.

An analysis of the scores of eighty-three graduates in the New York State Board examinations in October, 1956, showed a remarkable record. The comparison of this school's standard score means in these licensing examinations with other collegiate schools of nursing in New York State for the past three years showed a consistently high performance with no failures.

Faculty and students in the Department of Nursing have cooperated in several research projects in nursing education. The Cornell Study of Nursing under the direction of the Department of Sociology and Anthropology of Cornell University will determine what factors influence the selection or rejection of nursing as a profession. All of the first-year students joined in this study in February. In a study of cancer nursing in several basic collegiate schools, students in all three classes participated in tests to measure growth of cancer knowledge at different levels of education in each school and also in tests to evaluate nurse-patient relationships. The Institute of Research at Teacher's College conducted a study to determine the areas

of stress in nursing situations and student reactions. Paper and pencil tests and structured interviews were used to collect the data. Students from all three classes in the school have participated.

Standardized public health nursing tests developed by the American Public Health Association and those developed by the National League for Nursing were administered to all graduating seniors in June, 1957.

The first group of four students completed the twelve months' graduate program in maternity nursing and received the Master of Science degree in October, 1956. A certificate in nurse midwifery from the Maternity Center Association was awarded to each of these four graduate nurses.

The graduate program in maternity nursing has developed well during its second year. Two traineeships from the United States Public Health Service were assigned to the Department of Nursing by Professor Ray E. Trussell of the School of Public Health and Administrative Medicine in September, 1957, and were awarded to two graduate nurses enrolled in the program. A third student received a scholarship from the Maternity Center Association.

Three certificates in training in maternity nursing were awarded this year after completion of the four months' course here. The remaining four months were spent in study at the Maternity Center Association.

Two members of the faculty, Miss Beth L. Cameron, associate in nursing, and Miss Elizabeth S. Gill, associate in nursing, were assigned to part-time teaching in the Division of Nursing Education, Teachers College, at the request of Professor R. Louise McManus, Director of Nursing Education.

Field work for seventeen graduate students in the maternal and child health program at Teachers College was arranged on the obstetric and pediatric services by Professors Crawford and Peto. During the month of June a group of eight students majoring in administration and supervision of nursing services at Teachers College was given a full-time program arranged by Professor Marion D. Cleveland.

During the year thirty-two graduate nurses made up a deficiency in obstetric nursing by completing the twelve weeks' course of instruction and practice. An eight weeks' program in neurologic nursing was completed by eleven graduate nurses and an eight weeks' program in orthopedic nursing was completed by sixteen graduate nurses.

The Baccalaureate Service for the Class of 1957 was held in the Pauline A. Hartford Memorial Chapel on Sunday, June 2. At Columbia Commencement on Tuesday, June 4, the Bachelor of Science degree was conferred on 105 candidates from the Class of 1957. The graduation exercises in the garden of the Presbyterian Hospital were held on Thursday, June 6. Mr. Henry C. Alexander, vice-president of the Board of Trustees of the Presbyterian Hospital, presided. The address was given by Dr. Harry J. Carman, dean emeritus of Columbia College. Mrs. Frederic deRham, a

member of the Board of Trustees, presented the diplomas and Miss Helen Young, director emeritus of nursing, presented the pins to the 108 graduates.

The advisory committee for the public health nursing research project held its first meeting on March 26. The project will be directed from a total curriculum approach. The method of procedure and the first steps to be considered were discussed by members of the committee and included in the minutes distributed to all members.

A series of three conferences to discuss public health nursing field experience were held at the Visiting Nurse Service headquarters attended by representatives of the Bureau of Public Health Nursing, New York City Department of Health, Visiting Nurse Association of Brooklyn, and University nursing programs in this area. Professors Lee and Pettit attended.

A statewide conference on public health nursing field practice was held at the Thayer Hotel in West Point, March 27 through 30, 1957. The conference was sponsored by the Bureau of Public Health Nursing, New York State Department of Health, and the Upstate University of New York Department of Nursing. Professor Pettit and Mrs. Emma M. Cugle attended.

Professors Lee and Pettit have represented the nursing faculty in the Columbia University Seminar in the Role of the Health Professions. These meetings have been held twice a month at the New York School of Social Work and both nursing service and nursing education have been presented for discussion with the members representing all health fields.

Professor Lee attended the Hospital and Nursing Service Administration Conference, Princeton Inn, April 5 through 7, 1957, sponsored by the Program in Hospital Administration School of Public Health and Administrative Medicine and Division of Nursing Education, Teachers College.

Professor Pettit was chairman of the planning committee for the meeting of the Council of Member Agencies of the Baccalaureate and Higher Degree Programs of the National League of Nursing held in Chicago in November. Miss Esther Glad also attended these meetings.

The International Congress of Nurses met in Rome, Italy, from May 27 to June 2, 1957. Two faculty members made arrangements for the trip—Professor Dorothy E. Reilly and Miss Beth L. Cameron. A representative, Miss Barbara Farrell, Class of 1958, was chosen by the student body and had the stimulating experience of meeting student nurses from all over the world.

The New York State League of Nursing convention was held in Albany in October. Representatives from the faculty were Miss Yvonne Trebilcock and Mrs. Bertha Unger. The annual meeting of directors of nursing schools arranged by the New York State Education Department was held during the convention and was attended by Professors Lee and Pettit. The Student Nurses Association of New York State was a part of this convention and was

attended by two students from the Department of Nursing. Professor Pettit gave the keynote speech for the student group.

In December, Misses Elizabeth S. Gill and Ellen G. Smith attended a curriculum conference in Albany sponsored by the State League for Nursing and the State Education Department.

The Curriculum Conference sponsored by the North Atlantic Regional Council of State Leagues for Nursing and the National League for Nursing was held in New York City February 26 to March 1, and thirty-eight collegiate schools of nursing were represented.

The Eastern States Health Conference sponsored by the New York Academy of Medicine was held in April. Two representatives from the department and four of our students attended. The National League for Nursing Convention was held in Chicago, May 6 to 10, 1957. Professor Ruth M. Guinter, Miss Tschaepe, and two students attended. Professor Marjorie Peto wrote an article, "Communicating with Little Children," published in the *American Journal of Nursing* in the May issue.

Professor Delphine Wilde is orthopedic consultant for the National League of Nursing Curriculum Committee. Reports of meetings attended have been helpful to the faculty in reviewing the thread of rehabilitation throughout the nursing curriculum.

The Student Government Association honored 129 members of the Class of 1959 on January third at the dedication ceremony held in Sturges. The address was given by Dr. Philip D. Wiedel of the Department of Surgery and honorary member of the Class of 1957.

The Junior Bazaar was held in Maxwell Hall on April 4.

The National League for Nursing Department of Baccalaureate and Higher Degree Programs arranged an accreditation visit on November 11 to 17, 1956. At the meeting of the Collegiate Board of Review of the National League for Nursing on April 10, continuing full accreditation was accorded to the baccalaureate basic program of the Department of Nursing.

Four meetings of the officers of instruction have been held during the year. The professor of nursing and the associate professor of nursing have met monthly with the executive committee of assistant professors and also with all of the assistant professors.

DEPARTMENT OF OBSTETRICS AND GYNECOLOGY

Professor HOWARD C. TAYLOR, JR., Executive Officer

There have been no important changes in organization and only one or two additions to the staff of the Department of Obstetrics and Gynecology during the year just completed. Of note, however, is the appointment of Dr. Carl T. Javert as clinical professor of obstetrics and gynecology and director of the Woman's Hospital Division of St. Luke's Hospital. He is

replacing Dr. Albert H. Aldrige, who has retired after many successful years in the directorship of the Woman's Hospital.

Among new appointments are also to be noted those of Dr. Grace G. Herman, as assistant, Dr. Mary Jane Gray, as instructor, and Dr. Hyman Guthwin, as research associate. Drs. Joel Bitman, John Rosselet, and Dudipala V. N. Reddy all resigned during the year as research associates in biochemistry. Dr. Henry Clay Frick and Dr. Harold Speert were each promoted from the rank of associate to that of assistant professor of clinical obstetrics and gynecology.

During the year progress was made in the development of a program under a grant from the Josiah Macy, Jr., Foundation to promote the training of young men and women for careers in academic obstetrics and gynecology. Several years ago a survey conducted by the American Gynecological Society had indicated a serious shortage of personnel for teaching and research in this field and programs under the Macy grant were set up in several medical schools in an attempt to remedy this situation. The program at the College of Physicians and Surgeons is based on the thesis that, although the clinical training in this field is already excellent, the graduating resident who may desire a medical school position is almost totally lacking in research experience or training.

Under the program a number of scholarships have been made available which will permit medical students during elective periods in the curriculum or during spare time to undertake certain research projects. Such scholarships during the past year have been held by three students: Messrs. Martin Wohl, James Weir and Theodore Johnson. The latter has decided to spend twelve additional months between his third and fourth years in research related to reproduction in the laboratory of Professor Zuckerman, in Birmingham, England. During the past year two fellows have been in the department with a Macy fellowship: Dr. Mary Jane Gray, a former chief resident, now working with Dr. Albert Plentl on problems of transfer of deuterium across the placenta, and Dr. C. Edward Prince, who has spent a year studying problems of the physiology of the newborn. Two additional Macy fellows and perhaps a third are expected to begin their research training in July, 1957.

During the year there have also been a number of workers in the department enjoying fellowships from other sources. Dr. Helena Hughes of Manchester, England, has been the holder of the Barnes-Foster fellowship. Dr. Prabhakar Nagardes Shah of Bombay, India, has been on a fellowship from the Population Council, and Dr. Fumio Doko, of Okayama, Japan, has been a Damon Runyon Cancer Research Fellow. Dr. Pentti Lappaluoto of Finland has had a fellowship under the Institute of International Education and Dr. Ewald Hermann Roessler of Germany, a fellowship from the American College of Surgeons. Dr. Warner Nash, assigned to the Francis Delafield Hospital has been an American Cancer Society Clinical

Fellow. Beside this group there have been some thirty-six visitors from eighteen foreign countries, who have remained in the department as observers for longer or shorter periods of time.

There have been seven guest lecturers in the department of which three came from abroad. The latter included Dr. Hans Kottmeier of the Radiumhemmet in Stockholm, Sweden, who discussed "The Stockholm Method of Treatment of Cancer of the Cervix," Dr. F. W. Rogers Brambell, professor of zoology at the University College of North Wales, whose subject was "The Function of the Foetal Membranes," and Dr. Geoffrey S. Dawes of the Nuffield Institute of Oxford, England, speaking on "Fetal Oxygenation."

There have been no major changes in the organization of the teaching of obstetrics and gynecology during the last year. The graduate program in maternity nursing has become accepted as an integral part of the department's work. During the last year eight graduate nurses have completed the instruction under the program. Three of these students will receive the Master of Science degree and five a Certificate of Training.

The publication on a quarterly basis of *The Sloane Hospital Bulletin* continues under the able editorship of Professor D. Anthony D'Esopo, Dr. Robert Hall, and Dr. Harold Tovell.

The total number of deliveries, 4,120, was by a small margin the largest in the history of the Sloane Hospital. The increase has been entirely attributable to the ward service. The supply of patients seeking admission for delivery on the ward service seems virtually inexhaustible, a perhaps surprising situation in view of the frequently expressed fears that "teaching material" is about to vanish as a result of the widespread use of insurance plans.

The gynecologic service in the Sloane Hospital recorded 1,758 operations and 16,499 clinic visits. Here also there appears to be no evidence of any decrease in patients applying for care in the ward or outpatient department and no imminent threat to the present form of student instruction. To the gynecologic cases at the Sloane Hospital are to be added those at the Francis Delafield. Here there were 297 gynecologic admissions and 1,510 gynecologic clinic visits. The Delafield service shows a slow but consistent growth.

Dr. Seymour Lieberman, associate professor of biochemistry in obstetrics and gynecology, and his group are concerned with the chemistry and metabolism of the steroid hormones. In his laboratory, research on the nature of the urinary 17-ketosteroids excreted by normal individuals and patients with a variety of disease continues. The 17-ketosteroids excreted by pregnant women, pregnant women with Addison's disease, patients with Stein-Levanthal syndrome, and patients with Kimmelsteil-Wilson syndrome have been studied. Several methodological improvements have been developed for this class of steroids.

Drs. Jean P. Rosselet and Joel Bitman have developed a spectrophoto-

metric method which permits the quantitative analysis of binary mixtures of urinary steroids. In addition, Dr. Shlomo Burstein has developed a method for the hydrolysis of urinary sulfates which does not involve the use of either enzyme or mineral acid.

Dr. Stanley Ulick has continued to work on his chemical assay for the estimation of aldosterone. Drs. Samuel Solomon and Raymond L. Vande Wiele have continued their efforts to elucidate some of the finer details of the *in vivo* biosynthesis of the steroid hormones. Dr. Solomon has also studied the adrenal steroid biosynthesis by human fetal adrenals.

The work in Professor Jailer's endocrine laboratory has been greatly aided by a number of research fellows working under his direction. These are Drs. Dorothy Krieger, Adele D. Hofmann, Roy Wiggins and Julian Kitay. The presence of a factor which is capable of maintaining adrenal weight in hypophysectomized rats has been detected in the plasma of patients with Cushing's syndrome due to bilateral adrenal hyperplasia. It is of interest that pregnant women demonstrate an exaggerated response to ACTH (adrenocorticotrophichormone) and adrenal weight maintaining factor is present in their plasma.

In collaboration with Dr. Kreiger, hypothalamic lesions were produced in cats and it was seen that destruction of the median eminence prevented the release of ACTH as a result of insulin shock. Dr. Nicholas P. Christy of the Department of Medicine has shown that pre-treatment with thorazine will achieve similar results in patients.

Dr. Julian Kitay has developed a new *in vitro* assay for ACTH which depends upon the release of corticoids from rat adrenal slices.

Dr. Roy Wiggins has studied certain aspects of salt metabolism and aldosterone secretion in patients with pan-hypopituitarism and has found increased urinary aldosterone levels after dietary sodium restriction.

Professor Landrum B. Shettles' interesting observations on human ova have yielded further information. Three ova have been found to have undergone spontaneous, parthenogenetic cleavage within the intact ovarian follicle. A method was reported by which the sex of the infant can be correctly determined *in utero* beginning at the third month of gestation from the nuclear morphology of the cells in the amniotic fluid. A technique for simultaneous measuring of pelvic blood flow and uterine and cervical movement was worked out with Professor Frederic Agate, Jr., of the Department of Anatomy.

Dr. Anna L. S. Southam's work during the year has been much concerned with the study of "new steroid compounds with progestational activity" in the treatment of meno-metrorrhagia and amenorrhea. Histochemical studies on the endometrium of cases so treated have been done in collaboration with Drs. Prabhakar Shah and Margaret Long. Much of Dr. Southam's time in the last year has been spent on completing a book on sterility which she is writing with Dr. C. Lee Buxton, a former member

of this department and now professor of obstetrics and gynecology at Yale University.

Working with Dr. Southam have been Drs. Shah and Lappaluoto. These visiting fellows have been proceeding on the supposition that glycogen, lipid, and alkaline phosphatase in the surface epithelium and glands of the endometrium are under control of ovarian hormones and that these are vital for nourishment and implantation of a fertilized ovum.

The research activities of Professor Albert Plentl and his group are concerned with some fundamental aspects of the physiology of pregnancy and with the evaluation of drugs of use to the obstetrician. The investigations on isotope tracer studies on the origin and fate of the amniotic fluid are continuing. Thus far the tracer studies have been limited to the use of simple elements and compounds such as labelled water, sodium, and potassium. In order to study the more interesting subjects of fetal nutrition and transmission of drugs to the products of gestation, an increasingly complex series of organic compounds will be evaluated in an essentially similar manner. They will be tagged with carbon-14 (one of the radioisotopes of carbon), with tritium (one of the isotopes of hydrogen) or both. A large-scale study for the evaluation of certain hematinics in the treatment of anemia of pregnancy has been completed. The data on 1,142 patients were correlated and analyzed statistically.

Professor Gilbert Vosburgh has devoted a large part of his research time during the year to the designing and equipping a laboratory which will be concerned particularly with problems of placental transmission. Dr. Vincent Freda, a member of the resident staff is working with him on the antigen-antibody reactions in human blood with special reference to extra-group relationships between mother and fetus. Mr. James Weir, a Macy scholar, is utilizing paper electrophoresis in an attempt to isolate "menstrual toxin" and to characterize the protein of human amniotic fluid. Mr. Theodore Johnson, also a Macy scholar, has been investigating the electrolyte and water content of the human endometrium.

Dr. Mary Jane Gray has continued her work on the evaluation of sodium space and total body water in the normal patient at term and in the patients with toxemia of pregnancy.

The factors in the fibrinolytic enzyme system involved in production of hypofibrinogenemia, a condition leading to hemorrhage in obstetrical patients, has been extended under Dr. Louis L. Phillips. Part of this investigation is being carried out in cooperation with the Departments of Surgery, Urology, Medicine and Pediatrics. Two reports on this work have recently been published.

Among the more clinical investigations may be noted studies of placenta accreta by Drs. Emanuel A. Friedman and William N. Rotton of the resident staff and on pregnancy complicated by lupus erythematosus by Dr. Friedman and Dr. James W. Rutherford, also of the resident staff.

Professor William V. Cavanagh has completed a large statistical study on postmaturity. Drs. Dean J. Grandin and Robert Hall are completing an analysis of intrauterine fetal death. Professor Alvin J. B. Tillman is working on his monograph, "Toxemia of Pregnancy." Dr. Arnold N. Fenton has been studying the causes of fetal distress.

A useful means for the practical as well as the investigative analysis of labor has been the so-called "graphico-statistical cervimetric method" developed over the last few years in this department by Dr. Friedman. Dr. Friedman has likewise been studying the effects on labor of caudal anesthesia and the relative value of various oxytocics in postpartum patients. The clinical evaluation of sparteine sulfate as an oxytocic is being continued under the direction of Professor Plentl and Dr. Gray and thus far data on about 500 patients have been collected.

Professor Charles M. Steer is preparing a report on the probability of difficult labor and of fetal injury in relation to varying degrees of cephalopelvic disproportion.

The work on the cardio-pulmonary physiology of the newborn and on the relationship between accidents at the time of delivery and subsequent developmental defects in childhood has developed rapidly in the last year. This is a collaborative study shared by the Departments of Anesthesiology, Pediatrics, and Obstetrics and Gynecology. The team consists of Dr. Virginia Apgar of the Department of Anesthesiology, Dr. Stanley James of the Department of Pediatrics, assisted by Dr. Edward Prince of the Department of Obstetrics and Gynecology and Dr. Irwin M. Weisbrot of the Department of Pediatrics.

The effects on the newborn circulation of placental transfusion, i.e., the transfer of blood from placenta to baby before severance of the umbilical cord, is being studied, the results promising important practical knowledge for the obstetrician. With the assistance of a psychologist, Dr. Frances Schacter, a long-term follow-up, projected for eight to ten years, is being begun on a series of children upon whom determinations of blood oxygen content obtained immediately after birth are on record. A selected series of tests, psychologic and psychiatric, as well as neurological examinations, audiograms, and electroencephalograms, will be undertaken to determine if there are permanent ill effects related to adverse respiratory conditions at the end of labor and in the first minutes after birth.

The relative importance of cancer continues to increase at the Medical Center. The opportunities for the improvement of gynecological cancer therapy offered by this increase in patient material has been put to careful use by means of a carefully designed program of treatment arrived at in 1951 and revised in 1956 after a series of conferences held by members of the Departments of Radiology and Obstetrics and Gynecology. The research program in gynecological cancer may be said to be developing still under five general headings: (1) the relationship of the hormones to the

cause or spread of cancer; (2) the biochemical and biological characteristics of the cancer cell or of cancer tissue; (3) the problem of radiosensitivity; (4) the techniques of early diagnosis and the recognition of the precancerous lesion; and (5) clinical studies of clinical case material.

The work on the biochemistry of various steroid hormones has already been noted in the section on endocrinology in relation to work in the laboratories of Professors Lieberman and Jailer.

Studies of the biology and biochemistry of the cancer cell are under Drs. Margaret Long, Helena deRoethth, Saul Bader, Hyman Guthwin, and Harold Tovell. Dr. Long's project to study the histochemical characteristics of different grades of malignancy has continued along the lines described in the four previous years. A cytochemical analysis of the nucleolus in non-malignant endometrium and endometrial adenocarcinoma has been completed by Dr. Fumio Doko, a research fellow under Dr. Long's direction. A second cytochemical study, completed this year, reports observations on sites of activity of the enzyme succinic dehydrogenase in ovarian papillary serous tumors in relation to the histological grade of malignancy.

Dr. deRoethth has been studying the metabolic behavior of human gynecological tumors. Dr. deRoethth is also studying the survival rates of tumors by following glycolysis and oxygen consumption throughout a period of storage at room temperature. Dr. Guthwin has begun a long-range program designed to fractionate human gynecological tumors into various cellular compounds.

Quantitative measurements of the nucleoproteins of the cell nuclei of gynecological tumors are being determined by absorption microspectrophotometry by Dr. Bader. Attempts are being made to relate such data to degrees of malignancy in terms of the morphology and growth of the tumor cells. The study of the heterologous transplantation of malignant gynecologic cancers is progressing in the hands of Dr. Tovell.

Professor Saul B. Gusberg and his group have continued to study cervical cancer and radiosensitivity by cytological and cytochemical methods, which now enable them to predict with reasonable accuracy the radiosensitivity of cervical cancer by a cell smear method utilizing serial tumor biopsies under a test dose of radiation. These studies have been supplemented by the use of a purely cytological method developed in Boston by Dr. Ruth and John Graham. An investigation in Professor Gusberg's laboratory is also being conducted by Dr. Helen E. Hughes, Barnes-Foster fellow, of patients who do not have any known gynecological carcinoma, to determine the relationship between certain morphologic changes in basal cells and hormonal status. Dr. Gusberg and his group has continued their interest in uterine cancer precursors. With Dr. Southam, Professor Gusberg is studying the relationship between a certain type of cystic ovary and the development of hyperplasia and cancer of the endometrium.

The statistical analysis of results being obtained in cancer therapy has been greatly facilitated by the excellent follow-up system developed and

directed by Dr. David B. Moore. During the past year Dr. Henry C. Frick, II has analysed in great detail the "five-year" results in the cases of cancer of the cervix treated at the Sloane Hospital from 1944-1951. Professor Equinn W. Munnell has similarly studied the results in the therapy of cancer of the ovary for the same period.

Professor Emeritus James Corscaden has completed a report on leiomyosarcoma of the uterus and continues to prepare the statistics of the department submitted to the editor in Stockholm for inclusion in the international *Annual Reports*. Dr. Mary J. Gray has completed her study of radiation injuries observed during her period of study at the Radiumhemmet in Stockholm and has reviewed the cases of cancer of the cervix treated by extra peritoneal lymph node dissection in the Sloane and Francis Delafield Hospitals.

Dr. Lothar Gidro-Frank is continuing his instruction of students and residents on the emotional aspects of gynecological and obstetrical conditions and is completing the analysis of the voluminous psychological and psychiatric material collected in the "pelvic pain" project.

Professor Harold Speert has completed eighty assays on the 100 most commonly used eponymic terms in the specialty as applied to anatomical structures, operations, syndromes, tests, tumors, bacteria, and instruments.

During the last year Dr. Earl Engle, professor of anatomy assigned to obstetrics and gynecology, has been on sabbatical leave, but has devoted these months to a survey of the scientific status of departments of obstetrics and gynecology throughout the country. This project, sponsored by the American Gynecological Society has as its purpose the analysis of problems now facing departments of obstetrics and gynecology in their efforts to function as centers for teaching and research.

Members of the department have been very busy with outside activities during the past year, there being records of some forty lectures given to audiences outside of the Medical Center. There was particularly active participation in the meetings of the American College of Surgeons in San Francisco and of the American College of Obstetrics and Gynecology in Chicago.

Professor Joseph W. Jailer has been elected to the Board of Editors of the *Proceedings of the Society of Experimental Biology and Medicine* and to the Editorial Board of the *Journal of Clinical Endocrinology*. Professor Taylor continued as editor of the *American Journal of Obstetrics and Gynecology* and as a member of the editorial board of *Cancer*.

DEPARTMENT OF OPHTHALMOLOGY

Professor JOHN H. DUNNINGTON, Executive Officer

During the past year there have been no radical changes in the teaching programs, either undergraduate or resident, except for a conscious lessen-

ing of emphasis on didactic lectures and increased use of clinical demonstrations. For the medical students particular attention is being directed to correlating the ocular findings with systemic disease.

It is with great regret that we report Professor Ludwig von Sallmann's resignation to accept the position of Chief of the Ophthalmology Branch, National Institute of Neurological Diseases and Blindness, National Institutes of Health. His stimulating presence and keen investigative mind are sorely missed. On June 30 this year Dr. Gertrude Rand retires. Her efforts, combined with those of the late Professor LeGrand H. Hardy and Miss Catherine Rittler, were responsible for the establishment of the Knapp Laboratory of Physiological Optics. Her achievements in this field have won world-wide recognition for which we are justly proud, but our greatest inspiration has come from her courage and devotion to duty in spite of extreme physical handicaps. The untimely death of Dr. Gregory Barer, a loyal member of the department for the past sixteen years is sorrowfully recorded. We are pleased to announce that Drs. Robert P. Burns and Charles J. Campbell, former residents, have joined the department.

Professor George K. Smelser is directing the basic researches and under his guidance many interesting projects are being developed. The research potential of the department has been greatly expanded by the addition of a laboratory for the study of the ultra structure of ocular tissues by electron microscopy. Dr. George D. Pappas of the Department of Anatomy will be in charge of this cooperative venture. During the past year Professor Smelser's investigations have been on the embryology of the eye. Studies on the development of the rabbit eye have been conducted along the lines described last year. The time and location of formation of corneal and scleral sulfated mucopolysaccharides were described. Exophthalmos has been investigated. A method for surgical removal of the adrenal gland in guinea pigs has been used to determine whether adrenal cortical hormones are requisite for the development of exophthalmos in that species. Experiments have been carried out to determine if the swelling and edema of the orbital connective tissue and exophthalmos is due to the presence of an hydrophilic material. The healing of incisions in devitalized cornea has been studied. The healing of such wounds was compared with that of others made in normal corneal tissues. These findings were presented in a joint report with Professor Dunnington before the American Ophthalmological Society in May. The biological turnover rate of the sulfated mucopolysaccharides of various connective tissues has been studied. In conjunction with Professor Wilfred M. Copenhaver of the Department of Anatomy and Mr. Robert Quesenberry, an extensive radioautographic investigation of the metabolism of connective tissue sulphate has been started.

Professor Zacharias Dische has continued his studies on changes in the chemistry and synthesis of lens proteins during the development of galactose cataract. In conjunction with Dr. George R. Merriam, Jr., these studies

have been extended to other forms of experimental cataract, particularly tryptophan and radiation cataract. His studies on neutral heteropolysaccharides of the vitreous were continued with particular emphasis on the neutral mucopolysaccharides of the soluble proteins of the vitreous.

In the absence of Profesor Seymour P. Halbert on sabbatical leave, Dr. Patricia Fitzgerald has continued their studies on the role of the antibiotics produced by the normal flora of the eye and gastrointestinal tract on the course of infections. She has also conducted immunological studies on human and animal lenses. Blood sera from 200 patients with cataract were tested for the presence of antibody against pooled cataractous lenses with negative results. No antilens antibody was found in the sera of these patients. Also further work has been done on the purification of streptolysin "O" and other new streptococcal antigens.

The Knapp Foundation has supported the investigations of Dr. Virginia Weimar, who has studied the initial responses of tissues to injury. She also carried out other studies on the mechanism of the vacuolization of cells. Crystalline trypsin, chymotrypsin, and papain all induced this type of reaction in frog erythrocytes whereas vacuolization was inhibited by sodium salicylate, antipyrine, and aminopyrine, all known to be inhibitors of some proteolytic enzymes.

Dr. Godfred Larsen, from the Institute for Connective Tissue in Copenhagen, has been working in the laboratories under the auspices of the Knapp Foundation. His research has dealt with basic studies on the choroid and vitreous and the reactions of these tissues in inflammation and in various endocrine states. He presented his findings, "Hormonal Influence of the Viscosity of the Vitreous Body," at a meeting of the Eastern Section of the Association for Research in Ophthalmology in April.

Professor John H. Dunnington and Dr. Ellen F. Regan continuing their studies on ocular wound healing have devoted more attention to the early processes of repair. They studied the changes which occur in metachromasia of ground substance and in reticular and collagen content in limbal incisions similar to those used in cataract extraction. These findings were presented as the Francis I. Proctor Lecture before the University of California in December, 1956.

In the Knapp Memorial Laboratory of Physiological Optics, Dr. Gertrude Rand, Miss Catherine Rittler, and Dr. Charles J. Campbell continued their investigations on the evaluation of the electro-retinogram and flicker fusion in clinical ophthalmology. Dr. Campbell, with the assistance of Mr. Newton B. Chin, has completed his investigation on visibility under low levels of illumination and reported the findings to the Wright Air Development Center.

Dr. Otto Lowenstein and Miss Irene Lowenfeld have reported further observations on the mechanism of the pupillary responses.

Among other research problems undertaken in this department are: Pro-

fessor Algernon B. Reese and Dr. Gabriele Ehrlich's study on tissue cultures of ocular tumors; Dr. George R. Merriam, Jr.'s measurements of the amounts of radiation reaching the eye in the treatment of tumors of the eye, orbit, and adjacent structures; Dr. Graham Clark's investigation of responses of ocular tissue to various electrical currents; Dr. Andrew deRoethth's study of the metabolism of the iris; Dr. Philip Knapp's on measurement of ocular motility with the electro-oculograph.

The resident staff has taken an active part in the investigative activities. Drs. Robert P. Burns and Charles J. Campbell, whose terms of residency were completed during the past year, are continuing their researches. Dr. Burns, with the collaboration of Professor Harry M. Rose of the Department of Microbiology, is working on the value of tissue cultures in viral disease, and Dr. Campbell on electroretinography. Dr. Bradley R. Straatsma, under the direction of Professor Reese, is studying the radioactive phosphorus uptake of pigmented tumors of the conjunctiva. Dr. David H. Rhodes, Jr., has studied the visual fields using a contralateral stimulation technique.

Dr. John McTigue, with the assistance of Dr. Anthony Donn, has completed his studies on radioactive phosphorus uptake tests for malignant melanoma. Drs. Robert Ellsworth and Harold Spalter, in collaboration with Dr. Merriam, are attempting to measure visual acuity by means of X rays. Dr. Straatsma and Dr. Ellsworth are studying experimentally the fate of graft components in keratoplasty and Dr. Joan Hollenberg the development of the vitreous.

The members of the department have continued to take a most active part in both local and national organizations. At the October meeting of the American Academy of Ophthalmology and Otolaryngology ten members of this department presented instructional courses and Professor Reese and Dr. Straatsma won second prize for their exhibit on "Precancerous and Cancerous Melanoma of the Conjunctiva." Dr. Gordon M. Bruce has been appointed consultant in ophthalmology to the Surgeon General's Office, United States Navy. Professor Reese has served as chairman of the eye section of the American Medical Association and was awarded an honorary LL.D. degree from Duke University. Dr. Campbell obtained a Doctor of Medical Science degree from Columbia in June. Dr. George R. Merriam, Jr. and Dr. Joseph A. C. Wadsworth were elected to membership in the American Ophthalmological Society.

DEPARTMENT OF ORTHOPEDIC SURGERY

Professor FRANK E. STINCHFIELD, Executive Officer

During the past year, the department has expanded its research facilities and has done considerably more interdepartmental work.

Professor Halford Hallock, in conjunction with Dr. James B. Jones and Dr. Arthur J. Driscoll, published an excellent follow-up on ischiofemoral arthrodesis of the hip. Professor Hallock also gave instructional course lectures at the American Academy of Orthopaedic Surgeons on tarsal arthrodeses.

Professor Harrison L. McLaughlin has continued to be active in the field of surgery of trauma and has given numerous papers on this subject. One most important paper, "Undergraduate Education on Trauma," was published in the *Bulletin of the American College of Surgeons*, June, 1956. He has recently revised Volume II of the *Operative Technique Referable to the Musculoskeletal System* by Warren Cole, M.D. (1956).

Professor Everett C. Bragg has continued his interest in lumbar fusions and at the present time is doing research work on discograms. Professor Bragg and Dr. Frederick S. Craig are trying to determine the end results of the treatment of club feet treated with Dennis Browne splints as opposed to cases treated with plasters.

Professor Robert E. Carroll has confined his work almost exclusively to research in the field of hand surgery, and in April, 1957, published a paper entitled "Osteogenic Carcinoma in the Hand."

Dr. Keith McElroy has confined his research activities chiefly to the field of cerebral palsy, and is now in the process of describing an improved technique for transplantation of the hamstring muscles in cerebral palsy problems.

Professor William H. von Lackum has continued his work in the field of scoliosis and has made some valuable contributions to shortening the method of correction and fusion of the patient suffering from scoliosis.

Professor Charles T. Ryder has continued to work chiefly in the field of surgery of children, and together with Dr. John D. LeBouvier and Dr. Rosamond Kane, published a paper in pediatrics entitled "Coxa Plana." He is also continuing his investigation in the fetal life study.

Professor Melvin B. Watkins together with Dr. Robert L. Samilson and Dr. Daniel McC. Winters published a paper, "Acute Suppurative Arthritis," in December, 1956. Professor Watkins has also worked out a very helpful technique for posterolateral bone grafting for fusion of the lumbar and lumbosacral spine.

Professor Frederick M. Smith has continued his work in fractures of the elbow. Dr. George B. Ambrose is doing some original research work at the present time on slipped upper femoral epiphysis. Dr. Alexander Garcia co-operated in producing an exhibit on "Fractures in the Aged" at the recent American Medical Association meeting.

Professor Charles S. Neer II published a paper, "The Treatment of Fractures of the Femoral Shaft in Children," in February, 1957. At the present time he is doing some original research work on surgical pathology of the proximal humeral articulation.

Dr. Kenneth C. Francis, a new member of the staff, has interested himself chiefly in bone tumor work and has been active in that field. He read a paper, with Dr. Bradley L. Coley and Dr. Norman Higinbotham, on "Multiple Myeloma" at the American Academy of Orthopaedic Surgeons in January, 1957. He also gave an exhibit at the New York State Medical Society Meeting on multiple myeloma in May, 1957.

Professor Gabriel C. Godman is in charge of all the research in the histochemical laboratory. He has published several papers, including "Cell Transformation and Differentiation in Regenerating Striated Muscle," and "A Correlated Histochemical and Electron Microscopic Study of the Intranuclear Crystalline Aggregates of Adenovirus in HeLa Cells." He likewise has done considerable work with Professor Karl Meyer of the Department of Biochemistry and Dr. Henry Grossfeld of the Department of Medicine in the acid mucopolysaccharides produced in tissue culture. He is continuing his work both in the cytochemical study of the nuclear constituents in the course of cellular differentiation in typical growth and in neoplasia, as well as the influence of cortisone on the structure, composition, and functional activity of osteogenic "fibroblasts" in tissue culture.

Dr. C. Andrew Bassett has continued his research work in orthopedic surgery. He has been active in the development and perfection of the bone bank. He is at present evaluating 150 patients in which bank bone was used as the primary grafting material. Dr. Bassett has continued his investigation on calcium and phosphate ion exchange between bone and extracellular fluid. One of the most encouraging and stimulating projects which has been entered upon is interdepartmental research work between Dr. Bassett and Professor James B. Campbell of the Department of Neurological Surgery. The use of millipore in obtaining regeneration in the central and peripheral nervous systems holds great promise. It has been established that peripheral nerves will regenerate across large gaps with a re-establishment of function if mesenchymal cells capable of producing fibrous tissue scar can be prevented from invading the gap.

Professor C. Zent Garber, in charge of the orthopedic pathological laboratory, is working on a most challenging method for measurement of circulation pressures in bone marrow, and also has completed a paper, "Continuous and Semicontinuous Sampling Titrations."

Professor Stinchfield, together with Dr. Cyril Shea and Dr. Bernard Cooperman, presented a paper entitled "Replacement of the Femoral Head by Judet and Austin-Moore Prostheses."

The residents have shown a great interest in research and many are at present working on various research projects. Dr. Myron E. Shafer is working on nonspecific synovins of the hip. Dr. Meade J. Luby is doing a review of Columbia-Presbyterian Medical Center's patients having a total congenital hemihypertrophy related to adrenal and renal neoplasms. Dr. Marvin L.

Gordon is working on an evaluation of endocrine factors related to slipping of the capital femoral epiphysis, as well as on an analysis of fractures of the upper femoral shaft in association with ankylosis and arthrodesis of the hip. Dr. John C. Williams is reviewing all the chondrosarcomas on the orthopedic service for the last fifteen years.

Early in January the first postgraduate course in orthopedic surgery given here was attended by forty-two surgeons from thirteen states.

During the past year Professor Gabriel C. Godman has been transferred from the Department of Surgery to the Department of Orthopedic Surgery and is in charge of basic research in that field. Drs. Charles S. Neer II and Charles T. Ryder have been promoted from instructor to assistant professor of clinical orthopedic surgery. Dr. Robert E. Carroll has been promoted from instructor to assistant clinical professor of orthopedic surgery. Drs. Kenneth C. Francis and Alexander Papas were appointed instructors in orthopedic surgery.

DEPARTMENT OF OTOLARYNGOLOGY

Professor EDMUND P. FOWLER, JR., Executive Officer

The department has decreased further in size. Throughout the country demands for residencies in otolaryngology are increasing, as the dearth of qualified specialists in this field becomes more apparent to the medical professor and the general public. It is hoped that in a few years time our department can again be back to proper strength by filling up its ranks from below. It is felt that some of the trouble in recruiting qualified personnel is due to the fact that medical students are not sufficiently exposed to otolaryngology during their stay in medical school.

We are pleased to announce that Drs. Bela Marquit and Robert Hui have been promoted to the rank of assistant professor.

We have had several guest lecturers from abroad, notably Professor and Mrs. Ewing of Manchester, England; Professor Hans Engstrom of Göteborg, Sweden; Professor F. C. Ormerod of London; Professor H. Herrmann of Munich; and Professor M. Arslan of Padua, Italy. The department also served as host to innumerable members of the Sixth International Congress of Otolaryngology, held in Washington, May 5 through 10, 1957.

Professor Franz Altmann and Dr. Milos Basek completed a study on the intramucosal changes in laryngeal papillomas with Professor Arthur Purdy Stout of the Department of Surgery. Professors Altmann and Edmund P. Fowler, Jr., and Dr. Basek are continuing their studies of the mechanisms of the stapes mobilization and bone healing following mobilization of the stapes. Films on the basic mechanisms of stapes mobilization have been completed by Dr. Basek and Dr. Vladimir Epanchin, and have been shown

widely in this country and abroad. Professor Altmann continues his researches on tympanoplasty, and Dr. Basek is collecting material on anomalies of the facial nerve in the temporal bone.

Professor Fowler and Dr. Basek, with Dr. Epanchin, continued their studies of changes in small blood-vessel circulation following intravenous procaine or heparin. They are also developing a technique of observing small blood-vessel circulation in bat wings with a phase microscope. Professor Fowler, with the collaboration of Professor Wilfred Copenhaver of the Department of Anatomy, has begun experiments on the productions of anomalies of the ear, nose, and throat by changes in the circulatory patterns of amblystoma. He has also assisted Dr. Quartler of the Brookhaven Laboratories in studies of the vestibular disturbances following heavy radiation of hamsters with Xray

Drs. Morris Kalmon and Maurice Miller have completed a study on spontaneous recovery of sudden deafness. Mr. Richard Chase, one of our medical students, has continued his work on delayed feedback. He has also begun to study basic factors in delayed speech feedback with the hope that this may be useful in the study of central nervous pathways in general.

Professor Jules G. Waltner and Dr. Richard Fitton have completed a study of carcinoma of the maxillary sinuses. Professor Waltner has also developed a new procedure for voice rehabilitation following laryngofissure. Dr. Basek has been active with Professor B. Raymond Fink of the Department of Anesthesiology in the study of the mechanism of the opening of the human larynx. On the resident staff, Dr. Bruce Marshall is working on the final results of radical mastoidectomy. Dr. Louis Charbonneau is studying the spontaneous recovery of Bell's Palsy and Dr. David Hilding is studying the finer structure and microchemistry of the cochlea. Dr. Cesare DiRocco has been working on the small blood-vessel circulation of the cochlea of guinea pigs. In addition, these men are all taking the basic science courses in histology and operative anatomy given by various staff members in the evening, and perfecting their operative techniques on laboratory material before beginning work in the operating rooms.

DEPARTMENT OF PATHOLOGY

Professor HARRY P. SMITH, Executive Officer

The Department of Pathology, concerned as it is with the theory of disease, conducts its teaching and research in a rather wide variety of ways. Abnormalities in structure and function of the human organism are detected in part through use of the microscope and in part by the methods of the physiologist and biochemist. These studies are carried out on material secured in the autopsy room and from animal experimentation. It should be noted, in passing, that the autopsy room is operated by the department, not

only for its own teaching and research, but also to serve these functions in other departments of the Medical Center.

The department has recently provided space which permits two of the Hospital's diagnostic laboratories to be relocated in close proximity to the pathology laboratories. It is anticipated that the new arrangement will provide opportunity for more extensive training of residents and interns, both in the Department of Pathology and in the clinical departments. It seems evident that increasing specialization in teaching, research, and medical practice should be accompanied by cooperation across departmental lines, freely given and of a flexible type required to meet the needs of all concerned.

The research activities of the department during the past year illustrate the wide variety of methods employed in this field. The research of Professors Abner Wolf and David Cowen, and Dr. Lester Geller illustrates the anatomical technique in the study of birth injuries to the brain. Their work on severe repeated convulsions in infancy provides coordination of clinical and structural observations. Professor Wolf also conducted studies on the reduction of neotetrazolium by neural tissue.

Professor Wolf has also continued his research on demyelinating diseases of the nervous system and has collaborated with Dr. Edgar Housepian of the Department of Neurology in making a statistical study of congenital aneurysms of cerebral blood vessels.

Collaboration in research between pathologists and clinicians is also illustrated by the joint activities of Professor Dorothy Andersen and Dr. William A. Blanc of our department and Professor Paul A. di Sant'Agnese and Dr. Carolyn Denning of the Department of Pediatrics. Dr. Blanc has conducted studies on kernicterus of the newborn, observed in the absence of blood incompatibility. He and Dr. Melvin M. Grumbach of the Department of Pediatrics have applied the sex chromatin method to the investigation of hermaphrodites and pseudohermaphrodites. Dr. Joseph Reid has demonstrated the development of ceroid pigment with increasing age in the smooth muscle of fibrocystic patients.

At the Francis Delafield Hospital Professor Edith E. Sproul along with Drs. Silvio and Anna Fiala, have studied the altered pattern of respiratory and glycolytic metabolism in particles isolated in the ultracentrifuge from cells undergoing carcinogenesis. The relation of this pattern to the altered distribution of cytoplasmic ribonucleic acid was also investigated. These studies illustrate the importance of correlating the finer structure of the cell with cellular physiology and biochemistry.

Professor Theophilus W. Roberts at the Delafield Hospital has collaborated with Professors Hylan A. Bickerman and Alvan L. Barach of the Department of Medicine in a study of tumors of mice, as affected by anoxia. His part of the program was particularly concerned with the altered vascularity of the tumors.

The activities of Professor C. Zent Garber in the division of orthopedic

pathology represents collaboration in teaching and research with clinical colleagues in the Department of Orthopedic Surgery.

Particular attention is drawn to a new program for the instruction of orthopedic residents in the fundamental aspects of diseases of bones and joints. Note is also made of a method of measuring circulation pressures in bone marrow, now being developed by Professor Garber.

Dr. Hans Kaunitz, in collaboration with Dr. Waldo Ault and Dr. Daniel Swern of the Eastern Regional Laboratories of the United States Department of Agriculture, has studied the effects of oxidized fats on the efficiency of food utilization. Dr. Kaunitz has collaborated with Professor Charles A. Slanetz of the Department of Animal Care in an effort to apply these studies to the control of obesity.

Professor Henry S. Simms, in collaboration with Dr. Charles R. Harmison, has investigated the amount of lipfanogens in the serum of diabetic patients in acidosis. Professor Simms and Dr. Benjamin N. Berg have continued their study of the causes of the progressive increase in mortality in rats with advancing age.

The work of Professor Theodore F. Zucker and Dr. Lois M. Zucker represents fundamental research in the nutrition of animals bred to a standard type and maintained on carefully controlled diets. They have investigated the relationship between selective breeding for body size and dietary requirements for certain vitamins. They have also studied the effects of a diet deficient in pantothenic acid on the sensitivity of certain target organs of the adrenal cortex.

The work of Professor Wellington B. Stewart also involves fundamental physiologic and biochemical studies in animals. In addition to his studies on iron absorption, he and Professor George P. Vennart have investigated the ability of lysine and tryptophane to cure a certain type of fatty liver produced in rats by deficient diets. He has also collaborated with Professor Fred V. Lucas and Dr. William McLendon in the study of heme pigments of the dog.

DEPARTMENT OF PEDIATRICS

Professor RUSTIN McINTOSH, Executive Officer

Under the guidance of Professor Conrad M. Riley, the fourth-year clerkship has been revised to give the students more immediate responsibility in the care of patients. Clerk and resident now approach a new clinical problem in close collaboration, discussing differential diagnosis, planning the sequence of clinical and laboratory studies, and mapping out a therapeutic program in such a way as to throw the most light on the problem in hand.

Transfer of neurologic patients of pediatric age from the Neurological Institute to the inpatient service of Babies Hospital, a move which was insti-

tuted early in 1956, has added greatly to the teaching value of the students' pediatric assignment. Owing to the close collaboration which exists between the neurologic and pediatric services, the patient's problem is viewed from all angles and the risk of excessive concern with limited fields, to the neglect of the patient as a person, becomes minimized. Particular credit is due Professor Sidney Carter and his colleagues of the Department of Neurology, and likewise to the members of the Department of Neurological Surgery, who at no small inconvenience to themselves have made a significant contribution to the improvement of teaching and patient care in these specialized areas.

Dr. Sidney Blumenthal has been promoted to assistant clinical professor, Dr. Melvin M. Grumbach to associate, and Drs. Sylvia P. Griffiths, Peter R. Scaglione, and Leo F. J. Wilking, Jr., to the rank of instructor. New appointments include those of Dr. J. Frederick Eagle, Jr., as assistant clinical professor in charge of the pediatric service at St. Luke's Hospital; of Drs. Solomon J. Cohen, Shirley A. Mayer, Morton H. Rachelson, Walter R. Stankewick, and Ruth H. Strang as assistants.

The retirement of Professor J. Taylor Howell provides the occasion for pointing to his thirty-seven years of uninterrupted service in the pediatric division of Presbyterian Hospital and the department. It is fortunate that, with his continuing participation in private practice, the benefit of his long experience will continue for some years to be available to his colleagues on the pediatric staff.

Among distinguished visitors from foreign countries who spent some time visiting the department should be mentioned Dr. John Beveridge of the University of Sydney; Dr. H. Chandra of Osmania University Medical College, Hyderabad; Dr. B. E. Cohen of Tel-Aviv; Dr. M. Figueroa Moreira of Santiago, Chile; Dr. S. Heymann of the University of the Witwatersrand; Dr. P. J. E. Karlberg, of the Karoline Institute, Stockholm; Dr. O. Koonvisal of Bangkok; Dr. M. Navidi of Iran; Professor A. P. Norman, Deputy Director of the Institute of Child Health of London University; and Professor T. Sano of Sendai University, Japan.

Among the honors received and special services rendered by members of the department, mention should be made of Professor Hattie E. Alexander's Alpha Omega Alpha lectureship at Boston University, and her completion of a term as chairman of the Council of the American Pediatric Society. Professor Dorothy H. Andersen served as consultant to the Armed Forces Institute of Pathology. Professor John Caffey was elected an honorary member of the Royal Society of Medicine of England. Professors Paul A. di Sant'Agnese and Conrad M. Riley delivered papers at the International Pediatric Congress in Copenhagen. Professor di Sant'Agnese was also elected to membership in the American Pediatric Society. Professor Ruth C. Harris lectured before the Tokyo Pediatric Society, the Atomic Bomb Casualty Commission in Hiroshima, and at Christian Medical College, Ludhiana, India, and

before the staff of Great Ormond Street Hospital, London. Professor Rustin McIntosh was invited by the University of Birmingham to give the Leonard Parsons Memorial Lectures; he also addressed the Manchester Pediatric Club and the staff and graduate student body of the Institute of Child Health, London.

In a study of the initial infection with tuberculosis, Professor Hattie E. Alexander, Professor Douglas S. Damrosch and Dr. Saul Blatman have demonstrated, through recovery of viable organisms in gastric contents a year or more following the initial invasion, that healing of the primary focus is a much more protracted process than had hitherto been appreciated, regardless of therapy given. Studies of genetic transformation of bacteria have been actively pursued in Professor Alexander's laboratory by Professor S. Zamenhof of the Department of Biochemistry, Miss Grace Leidy, and Miss Eros Hahn. Application of comparable principles of transformation to viruses on the part of Dr. Katherine Sprunt and Dr. Isobel M. Mountain has strengthened the concept that lasting changes in the properties of filterable viruses may be brought about through what appears to be a guided genetic mutation. The theoretical implications of this work have aroused widespread interest, since it opens up the possibility of modifying viral virulence while retaining adequate antigenicity for prophylactic immunization.

Professor Dorothy H. Andersen and Dr. William A. Blanc of the Department of Pathology have cooperated with members of the Departments of Pediatrics and of Obstetrics and Gynecology in studying causes of fetal and neonatal death. New techniques have been devised for the study of amniotitis, the significance of which in perinatal pathology has been given increased emphasis by these observations. Dr. Carolyn Denning has made a study of the electrophoretic pattern of serum protein in cystic fibrosis of the pancreas.

In collaboration with Professor Zacharias Dische of the Department of Biochemistry, Professor di Sant'Agnese has continued his efforts to identify the peculiar mucopolysaccharides and mucoproteins recovered from the secretions of patients with cystic fibrosis of the pancreas. Adults with chronic pulmonary disease have been studied, with the participation of Dr. John A. Wood of the Department of Medicine, and a search organized for atypical or subclinical manifestations of pancreatic fibrosis. Professor di Sant'Agnese has collaborated also with various members of the Department of Surgery in studies of fat absorption from the intestinal tract, in both health and disease, the test foods being lipids tagged with radioactive iodine for ready tracing. A pattern of disturbed intestinal fat absorption has been found in patients with cystic fibrosis of the pancreas which differ sharply from that of patients with other forms of pancreatic deficiency. Utilizing technical methods developed by Professor Heinrich B. Waelsch of the Department of Biochemistry, Professor di Sant'Agnese has been studying the behavior of the blood content of glutamine and glutamic acid following oral adminis-

tration of various fractions of wheat gluten. The response of patients with celiac disease has been compared to that of normal controls, and it is hoped that this test will prove to be of considerable use in diagnosis, as well as in the elucidation of the pathologic physiology of this disease.

With Professor Ralph E. Moloshok, Dr. Melvin M. Grumbach has undertaken the study of goiters occurring in infants and children, including those associated with signs of hypothyroidism. With the help of Professor Seymour Lieberman and his associates of the Department of Biochemistry, investigation is being pursued of the biochemical defect in infants who present the salt-losing form of congenital adrenal hyperplasia. Professor Ruth C. Harris has enlarged the scope of her studies of liver function in early life, adding the evaluation of serum transaminase levels to the battery of tests already in common use. Considerable progress has been made in the differentiation of patients with congenital obstruction of the bile ducts from those suffering from other causes of jaundice in early life.

Dr. Gilbert W. Mellin's direction of the fetal life study has greatly accelerated the coding process by which a large mass of original observations is being prepared for analysis and determination of correlations through modern sorting techniques. Close cooperation has been afforded by members of various clinical departments, including especially those of Obstetrics and Gynecology, Radiology, Orthopedic Surgery, and Dental and Oral Surgery, so that these data will have unusual validity in defining the range of normal variation with relation to age. New patients are being admitted to the study at the rate of approximately 850 per annum.

DEPARTMENT OF PHARMACOLOGY

Professor HARRY B. VAN DYKE, Executive Officer

Two staff members are leaving the department to accept new positions in metropolitan New York. Professor Paul Brazeau will join the Department of Pharmacology of the Albert Einstein College of Medicine of Yeshiva University on January 1, 1958. Dr. Sheldon B. Gertner will become assistant professor of pharmacology in the Seton Hall College of Medicine at the end of the academic year. The department is fortunate in securing a new member of its staff, Professor Wilbur H. Sawyer, who has resigned from the New York University College of Medicine in order to accept appointment in the College of Physicians and Surgeons from July 1, 1957.

As in the past, some aspects of the teaching have been modified in exploring additional methods of presenting the features of the action of drugs and of balancing the time given to old and important drugs with that devoted to the flood of new remedies among which there will be many to be discarded for one reason or another. In laboratory teaching, principal reliance was placed on demonstration-experiments for a few of which replacement

experiments are sought from year to year. Professor Shih-Chun Wang introduced important new experiments in neuropharmacology. A guest-scientist, Dr. J. A. Schneider of the Ciba Research Laboratories, gave a striking demonstration of the action of drugs on pulmonary reflexes. Professors Virginia Apgar, M. Jack Frumin, and Emanuel M. Papper of the Department of Anesthesiology demonstrated the action of anesthetics in man with the high degree of success which has attended their contributions in previous years. Professors Alfred Gellhorn and John V. Taggart of the Department of Medicine again gave lectures related to their special scientific interests. One innovation this year was the opportunity of groups into which the class was subdivided to visit a pharmaceutical research laboratory and to observe the intricate steps required for the production of drugs.

The department collaborates with the Department of Medicine in presenting fundamental and applied pharmacology to third- and fourth-year medical students. Representatives of the two departments are Professors Frederick G. Hofmann and Hamilton Southworth who select topics which are not repeated in two successive years.

Five graduate students and two postgraduate students were working in the department during the year. Miss Sarah S. Henry and Mr. Morton I. Cohen received the degree of Doctor of Philosophy at the end of the year. One important problem in graduate education is to secure financial support for students during the first year of the period of training, which requires at least four years for a Ph.D. in pharmacology. Through a generous gift the department has been enabled to give some financial support to one or more graduate students during a restricted period. It is hoped that this fund will grow as the need for such support becomes more widely appreciated.

Research interests of the staff cover a wide range of topics. Professor Herbert J. Bartelstone investigated the control of the external secretion of the pancreas by the autonomic nervous system and by drugs which affect this system.

Professor Paul Brazeau is continuing his investigation of the degree of autonomy in the systems which transport electrolytes in the kidney of the dog.

Dr. Sarah S. Henry, working in collaboration with Professor van Dyke, studied the components of crude and of highly purified interstitial cell-stimulating hormone of the anterior pituitary gland. New criteria of purity for the protein hormones are demanded by studies such as these which were based upon a unique application of a new immunological method. Dr. Clifford D. Jessup investigated the distribution of neurohypophysial hormones in the pituitary gland and overlying diencephalon in chickens. This problem is interesting because of the peculiar vasodepressor response to oxytocin in birds such as the fowl and duck. Professor van Dyke was associated with Dr. Jessup in these experiments. Dr. Alastair R. Currie of the University of Glasgow and Professor van Dyke are investigating the neurohypophysial hormones of human pituitary glands removed shortly after death. Possible

correlation with disease as well as the nature of the human hormones are the principal topics under investigation.

Dr. Sheldon B. Gertner has been investigating the synthesis of highly active agents such as serotonin (5-hydroxytryptamine) by the superior cervical ganglion.

The biosynthesis of the steroid hormones and related substances has been the special field of interest of Professor Hofmann for several years. He studied hydroxylation at carbon 17 of the steroids of the adrenal glands of albino mice, albino rats, guinea pigs, kangaroo rats, and Mongolian gerbils. Other studies were made of the hydroxylation of carbon 17 by cell-free homogenates of the guinea-pig adrenal glands. The effects of vitamins, hormones, and drugs on the synthesis of steroids were also investigated.

Professor Wang, in collaboration with Drs. Herman I. Chinn and Alfred A. Renzi, completed an investigation on the importance of afferent innervation of the gastrointestinal tract in experimental motion sickness. The anti-emetic properties of perphenazine (trilofon) were investigated. Several students, both graduate and undergraduate, collaborated with Professor Wang. Dr. Suhayl Jabbur from the American University at Beirut, Lebanon, who is a candidate for the Ph.D. degree, is attempting to map out the central mechanism for cardio-acceleration in the medulla oblongata of the cat. Mr. Morton I. Cohen has completed his Ph.D. thesis on the respiratory neuronal activity in the pons of the cat. Mr. Robert G. Grossman, a fourth-year medical student, completed a paper, "Thalamic Inhibition of Subcortically Induced Locomotor Movement," which has been accepted for publication by the *Journal of Neurophysiology*. Mr. Bert Horwitz, a third-year medical student, used direct electric stimulation to study depression of the hypothalamus by reserpine. Mr. Le Roy Costantin, a second-year student, investigated the problem of functional revival of the hypothalamus after periods of complete occlusion of cerebral vessels.

Other intra- and extramural activities of the staff should be recorded. Professor Hofmann served on the Committee on Animal Care. Professor Bartelstone assumed the chairmanship of the New York Section of the International Association for Dental Research. Professor van Dyke served in the University of Hong Kong as visiting professor of pharmacology for three months. He also visited centers of medical education and research in Japan, the Philippines, Taiwan (Formosa), Indonesia, Malaya, Thailand, Burma, and India.

DEPARTMENT OF PHYSICAL MEDICINE AND REHABILITATION

Professor ROBERT C. DARLING, Executive Officer

The broad implications of the term *rehabilitation* require that the department be concerned not only with the strictly medical aspects of the subject,

but also with various other phases involving the disabled population. The latter include collaboration in nonmedical areas of the University and in the comprehensive activities of our affiliate, the Institute for the Crippled and Disabled.

Professor Robert C. Darling collaborated with Professor Abraham Jacobs of Teachers College in a course on medical aspects of rehabilitation at Teachers College, presented primarily for students in vocational counseling. Professor Darling participated again in the Conference of Rehabilitation Centers and presented a paper, "The Special Role of the Physician in the Rehabilitation Center" at the Institute on Rehabilitation Center Planning conducted by that organization. The June Workshop of the Institute for the Crippled and Disabled, conducted for a wide variety of rehabilitation workers, was again the scene of collaboration between this department, the Institute, and Teachers College. Professor William Benham Snow has been engaged in an examination survey of handicapped children in the New York City schools. Professor Morton Hoberman, in his work at the New York State Rehabilitation Hospital, has participated in a survey of the potential for rehabilitation among disabled welfare recipients in the State. Professor A. David Gurewitsch attended the World Federation of United Nations Associations in Geneva, as a representative of the American Association.

Contributions to undergraduate medical education have continued in the form of selected topics presented in public health, physical diagnosis, and correlation clinics, and an elective quarter for specially interested third-year students. Considerable planning has been made toward further presentation of rehabilitation principles to undergraduate students, particularly in their group clinic experience. The next year should see realization of some of these plans.

Residency training is a major concern to help fill the great need for specialists. Generous support of fellowships from the United States Department of Health, Education and Welfare has met an important need, but recruitment of trainees is still inadequate. In the coming year, however, the available traineeship positions will be nearly completely filled. The course of training has been enhanced by increased numbers of teaching rounds, by increased acceptance by the hospital services of the role of this department in total rehabilitation planning, and by broadened experience for the trainees at the Institute for the Crippled and Disabled. Collaboration with the Departments of Psychiatry and Orthopedic Surgery in conferences on rehabilitation further enriches experience for these students.

The postgraduate courses in cerebral palsy were given twice with capacity enrollment, the largest in the five-year history of the courses. Mrs. Isabel Robinault, as coordinator of the courses, has made notable improvements in blending basic science and didactic medical knowledge with a variety of clinical experience. Rehabilitation nurses and speech therapists were admitted for the first time to these courses.

Dr. Shyh-Jong Yue is preparing for publication the results of his and Professor Darling's study of some physiological aspects of rest. Dr. Yue has been studying at the Institute for the Crippled and Disabled the validity of medical examination in predicting vocational potentials of cerebral-palsied adults, and is embarking on a study of various prosthetic problems, including that of prostheses for hemipelvectomy patients.

Professor A. David Gurewitsch visited numerous medical facilities in Morocco at the invitation of the Minister of Health of that country. He and Professor Hoberman attended the Elizabeth Dieke Institute in Überlingen, Germany, to study new methods of massage.

Professor Hoberman was promoted to associate clinical professor; Dr. Lawrence Wisham joined the staff as associate clinical professor at Mount Sinai Hospital; Dr. Yue, formerly a fellow, became an instructor in the department.

OCCUPATIONAL THERAPY

Enrollment for 1956-1957 remained stable, compared with the 1955-1956 figures, with forty students registered in the academic program and twenty-six for supervised clinical experience in affiliated hospitals. However, this figure is 20 per cent below the enrollment ceiling. Although 63 per cent of the students received some degree of scholarship support from several sources, the cost of education has increased more than the available subsidies. In view of the great national need for occupational therapists, it becomes necessary to seek larger and more assured scholarship support and at the same time to develop more aggressive recruitment activities.

Eleven students completed requirements for the Bachelor of Science degree and fifteen for the certificate. Of the twenty-four graduates who took the occupational therapy registration examination in February in competition with 276 graduates throughout the country, three were among the top five and eighteen were in the top half.

In line with growing emphasis on vocational knowledge for occupational therapists, a new course in occupational analysis was introduced. Important laboratory experience is included, in addition to orientation lectures.

Thirty-two students received clinical instruction in twenty-one hospitals or agencies. Newly utilized training centers include Hartford Rehabilitation Center, Hartford, Connecticut; Montefiore Hospital, New York City; Mount Morris Tuberculosis Hospital, Mount Morris, New York. Coordination of clinical training was maintained by a meeting with the clinical supervisors of the affiliates conducted jointly with New York University, Richmond Professional Institute, and the University of Pennsylvania, and by visits of Professor Marie Louise Franciscus and Miss Virginia Kilburn to twenty-one training centers.

In addition to the fellowships and new course noted above a new teaching manual on woodworking techniques has been prepared by Miss Edith

Brokaw. Manuals prepared last year on occupational therapy in orthopedic and neurological conditions by Miss Marguerite Abbott and in upper extremity prostheses by Miss Thelma Wellerson have been published and utilized to enhance teaching of these subjects.

Mrs. Helen Rothwell completed a two-year fellowship and Miss Abbott, a one-year fellowship, under the auspices of the National Foundation for Infantile Paralysis; Miss Geraldine Shevlin enters upon a two-year similar fellowship program in September. These fellowship programs illustrate the advantages of graduate programs for future teachers in occupational therapy, combining practical experience with course work at Teachers College.

Miss Kilburn resigned to assume a national educational position in the American Occupational Therapy Association; Miss Martha Schnebly will succeed her as instructor and associate director of training for occupational therapists. Mrs. Helen White, instructor, resigned to become occupational therapy consultant with the United Hospital Fund.

Professor Franciscus has prepared a descriptive article on occupational therapy education in the United States for publication in France; she is a member of the executive board and the board of managers of the American Occupational Therapy Association. Miss Kilburn is first vice-president and member of the executive committee of the New York Occupational Therapy Association. Miss Abbott is a member of the editorial board of the *Cerebral Palsy Review*.

PHYSICAL THERAPY

Forty-seven students entered the academic year of study, of whom six withdrew in the course of the year. Of the remaining forty-one, twenty-three were in the two-year degree program and eighteen in the one-year certificate program. Students entered from preliminary education in thirty-eight colleges and universities. Nineteen students had some degree of scholarship support.

Applications for the certificate program continue to be double those for the degree program (eighty-eight vs. forty-two this year). Late summer withdrawals account for the fact that the classes were not quite up to full capacity. In view of the national shortage of physical therapists, procedures are being tried to fill more efficiently all late-occurring vacancies.

Because students enter training with variable backgrounds in biology and physiology, physiology instruction was divided into two classes, a beginning and a somewhat more advanced class. This arrangement has proved educationally sound for both the physical therapy students and those in occupational therapy who take the same course.

Elective exercises for the showing of the many available teaching films in the field have proved a well-received adjunct to the regular classes; it is planned to expand and regularize the showing of such films.

Affiliates for clinical practice have been increased by the addition of

Roosevelt Hospital, New York City and Hartford Rehabilitation Center, Hartford, Connecticut. The clinical facilities in Presbyterian Hospital have been reorientated in the past year better to meet the needs of students in clinical practice. As a result, this desirable experience close to headquarters could be scheduled for an increasing percentage of students.

Miss Gladys Jameson has resigned as associate director and instructor; Miss Ruth Dickinson is being promoted to her position. Mr. George Jessup has been appointed instructor. Miss Mary Cover in her enhanced position as supervising therapist at Presbyterian Hospital has been able to contribute more to the teaching program.

Professor Mary Callahan and Miss Jameson contributed to and helped organize an institute for geriatric rehabilitation given by the Greater New York District of New York Chapter of the American Physical Therapy Association. They both took part in numerous recruitment programs and activities of professional physical therapy associations.

DEPARTMENT OF PHYSIOLOGY

Professor MAGNUS I. GREGERSEN, Executive Officer

The University lost an exceedingly able and productive investigator when Dr. Thomas H. Allen, associate professor, resigned in July, 1956, to become chief of the Division of Physiology at the Medical Nutrition Laboratories of the Fitzsimmons Army Hospital, Denver, Colorado. Dr. Larissa Lukin, instructor, resigned November 1, to become assistant professor of physiology at the University of Ohio. Dr. Nicholas A. DiSalvo, assistant professor, has been made associate professor of dentistry. He will continue his active interest in special training in physiology for dental students. Several new appointments have been made to fill vacancies on the staff. Dr. Werner R. Loewenstein, professor extraordinarius of the University of Santiago de Chile, will join the department as assistant professor in July and set up a research program in the rapidly growing field of sensory physiology. Dr. Robert Dellenback, who received his graduate training at the University of California at Los Angeles, was appointed instructor in physiology in November, after returning to this country from a year as Eli Lilly Postdoctoral Fellow at the University of Würzburg. Dr. Gerd Muelheims, a medical graduate of Heidelberg and subsequently research fellow in the Department of Medicine in this institution, is joining the staff as instructor in July, and Dr. George Richard Rowley, who was trained in biochemistry and physiology at Rutgers University and recently worked on analytic procedures for drug assays, will join the staff as instructor in September. Mr. Leonard Levine, assistant in physiology, has been advanced to instructor.

The organization of the medical course in physiology and the physical facilities and equipment for teaching have this year been subjected to an

intensive review. As a result, plans have been completed and provisions made for setting up a pilot teaching unit next fall which will embody modern electronic methods for recording physiological phenomena. This will give the staff the first opportunity in several years to revise student laboratory work and to include the study of phenomena which could not be approached with present student equipment. The need for modernization of the student laboratory facilities has long been felt, and the pilot teaching laboratory will be utilized to test the practicability of new recording methods for general student use. In addition, the facilities for the entire class will also be improved by setting up a laboratory in which students may carry out special analytical procedures undisturbed by the activities in the main laboratory.

At the very beginning of the medical course in physiology, which again was supervised by Professor William Walcott, the students were given an opportunity to apply the statistical methods taught them by Professor John W. Fertig of the School of Public Health and Administrative Medicine. Original data on body temperature, pulse rate, respiration rate, ventilation, etc., collected in the laboratory were analyzed and presented by the students at a symposium. The organized presentations as well as the discussions served to emphasize the use of statistical methods in evaluating so-called "normal values" and deviations from the normal range in health and disease. Dr. Mero Nocenti, this year gave lectures on the endocrine glands to fill a gap which has been developing in the first-year curriculum during the past few years, and conferences have been held with other basic science departments to improve correlation and avoid duplication of subject matter in the first-year teaching.

In the film "Secrets of the Heart" produced by the American Heart Association, Professor Walcott demonstrated the isolated perfused mammalian heart, and Professor William L. Nastuk demonstrated the intracellular recording of membrane potentials in single muscle fibers and discussed some salient basic problems in neurophysiology. Three members of the staff, Professors Gregersen, Root, and Louis J. Cizek, contributed various sections to the textbook *Medical Physiology* edited by Professor Philip Bard of Johns Hopkins School of Medicine and published by C. V. Mosby Company.

During the summer of 1956, Professor Nastuk replaced Professor Cizek, who was on temporary sick leave, as departmental representative for the Summer Session. Professor Nastuk also directed the research of two medical students, Messrs. Arthur Strauss and James R. Carter, Jr., who held student summer research fellowships. Mr. Carter's investigation was concerned with the neuromuscular activity of the toxin streptolysin O. Mr. Strauss studied the lactic acid dehydrogenase activity in the serum of myasthenia gravis patients. Miss Barbara Olson, working with Professor Nastuk, has carried out experiments to clarify the structure-activity relationships of tensilon and its analogues in neuromuscular transmission and also has begun an independent investigation on the mode of action of strychnine. Mr. Leonard

Levine, working with Professor Nastuk, has made further studies on chronically denervated skeletal muscle, and Professor Nastuk has continued investigation of the humoral factors in the causation of myasthenia gravis.

With the cooperation of Professor Roberts Rugh of the Department of Radiology, Professor Gregersen and Dr. Charles Pallavicini have made further study of the effects of head irradiation on the chemistry of brain tissue, utilizing methods for limiting the radiation sharply to one half of the skull, thus permitting the unirradiated half of the brain to be used for control analyses.

Drs. Shu Chien and Meng-Tsung Peng, working with Professor Gregersen, have investigated blood volume in relation to head irradiation.

Professor Cizek has continued his long-term study of drinking in laboratory animals and the elucidation of the peripheral and central factors concerned. Dr. Chien, working under the direction of Professor Gregersen, has completed a carefully controlled quantitative evaluation of the circulatory adjustments of splenectomized dogs to hemorrhage, which he presented for his Ph.D. dissertation.

Dr. Ruth Rawson with Drs. Dellenback, Peng, and Chien, has reinvestigated the tolerance of splenectomized dogs to hemorrhage and settled the problem of the LD 50 in this preparation, when subjected to acute blood loss.

Professor Root has edited the section on the life history of the erythrocyte to be included in the next edition of *Methods in Medical Research*. He has served as chairman of the Animal Care Committee, and he and Professor Nastuk continued as members of the Board of Directors of the New York State Society for Medical Research. Professors Walcott and Root have served as members of the Council of the New York Academy of Sciences. Professor Root was recently elected a member of the Society for the Study of Blood.

Professor DiSalvo, in addition to his teaching duties in the department, participated in a postgraduate dental course on the biological principles of dentistry, and in an undergraduate course for dental students on oral diagnosis. He has this year completed studies on the radiophosphorous uptake in teeth and on the effects of compression of teeth. He also completed a study of clinical caries in children in day nurseries in New York City. In cooperation with the Department of Neurological Surgery, Professor DiSalvo investigated the distribution of taste sensation in the anterior two-thirds of the tongue in young and old individuals and on individuals with section of the sensory division of the trigeminal nerve.

Dr. Dellenback has started investigations of metabolism of brain tissue slices with particular reference to the effects of X irradiation and metabolic disturbances, and Dr. Nocenti is investigating the latent effects of diethylstilbestrol on ovarian physiology in the rat. Dr. Hrachovec, who held a temporary appointment as instructor, collaborated with Dr. Pallavicini on the effects of radiation on brain lipids.

The records reveal that over four hundred publications have appeared

from this laboratory in the past nineteen years. These reports deal with investigations of a wide variety of physiological and clinical problems including among others, studies on traumatic and hemorrhage shock, blood volume, water balance, erythropoiesis, membrane phenomena, neuromuscular transmission, myasthenia gravis, thirst, renal function, ether anesthesia, autonomic nervous system, vomiting center, urinary bladder, disturbances in electrolyte and acid-base balance, blood gases and carbon monoxide, ballistocardiography, cardiac output, spinal and totally sympathectomized preparations, salivary secretion, labyrinth, biological effects of radiation, radioactive isotopes, relation of structure to behavior of vital dyes, vascular reflexes, nervous control of respiration, chemistry of brain tissue, and various researches on oral physiology. This diversity of investigational activities is the result of a deliberate policy, befitting a university, to encourage students, research fellows, and members of the staff to follow their individual interests whenever possible and to develop independent fields of research. As a consequence, those who have gone out from the laboratory to other institutions have continued to be independent and productive investigators.

DEPARTMENT OF PSYCHIATRY

Professor LAWRENCE C. KOLB, Executive Officer

While there have been no major changes in the courses of instruction provided by the department during this past year, certain new areas of teaching have been opened and plans are underway for improving both curriculum and methods in the future.

The proposed course of instruction for psychiatric administrators, described in the report last year and carried as an interdepartmental venture between the department and the School of Public Health and Administrative Medicine, was initiated during the fall. Professor Viola Bernard, charged with the development of the curriculum, presented a plan of instruction to the Committee on Mental Hospital Administrators of the American Psychiatric Association. Professor Bernard emphasized at the time of this presentation that the course of instruction here was designed to prepare interested physicians in recognizing and working widely in the community rather than limiting themselves to mental hospital administration per se.

With the appointment of Professor Arthur C. Carr in medical psychology in the department, instruction in the field of clinical psychology has been initiated for medical students and psychiatric residents. Professors Carr and Carney Landis have prepared plans for the development of a training program for doctoral interns in clinical psychology and have applied for funds to support such a development. This training would be conducted under the auspices of the department.

During the past year the department has been developing a laboratory of human behavior in the Psychiatric Institute, where it will be possible to record both overt behavior and its physiological concomitants simultaneously through the medium of closed circuit television. It is expected that this laboratory will become a center for demonstration of various types of behavioral disturbances, including the psychosomatic, and of various therapeutic techniques. By means of projection to the auditorium it will be possible to provide continuing class room demonstrations to large groups of students both undergraduate and graduate. In addition, the definitive recording of the data through the development of audiovisual technics should make available, for the first time, means of inscribing and maintaining material for analysis, a methodology in which the science of psychiatry has been deficient. It is hoped that construction on this laboratory may begin during the coming year and that its usage may be initiated in the subsequent year.

The postgraduate course in neurology and psychiatry was attended this year by thirty-eight psychiatrists, twenty-one of whom were from the psychiatric staffs of the various New York State mental hospitals. Professor H. Houston Merritt of the Department of Neurology was responsible for the planning and supervision of the neurological aspect of the program and ten members of his department handled the teaching and instruction. The Department of Psychiatry provided twenty-four lecturers, who presented a broad coverage of the field.

In February, 1957, the Columbia University Psychoanalytic Clinic was visited by Dr. Bertram D. Lewin and Miss Helen Ross in the course of their national survey of psychoanalytic education conducted under the aegis of the American Psychoanalytic Association. This visit was a mutually rewarding experience. Dr. Lewin and Miss Ross sat in on all formal classes, attended supervisor sessions, and reviewed the administrative functions of the Clinic. The teaching program at the Clinic remained virtually unchanged this year. Dr. Thomas A. French, associate director of the Chicago Institute for Psychoanalysis, delivered the second of the Sandor Rado Lectures.

The training program at the State Hospital of New York State has continued to play a significant part in the Clinic's teaching activities. Dr. Daniel Shapiro has been appointed to replace Dr. Bruce Buchenholz, who has resigned, as coordinator of the teaching activities at Manhattan State Hospital, Harlem Valley State Hospital, and Hudson River State Hospital. Working at Manhattan State Hospital are Drs. Andre Ballard, Howard Davidman, Elizabeth Davis, Alvin Polatin, Daniel Shapiro, and Jack Sheps. The teaching at Harlem Valley State Hospital is being done by Drs. Alfred Messer, Elias Savitsky, and Professor Robert Senescu. Dr. Joseph Lubart is at Hudson River State Hospital.

With the development of the Children's Outpatient Service at the Psychiatric Institute, the teaching of undergraduate medical students has been

modified so that patients are available both here and in the children's psychiatric outpatient department of Babies Hospital. Each student is now assigned a case for study with the goal of acquainting him with the interviewing of children and parents. The instructors have been provided appointments both at the Psychiatric Institute and the Presbyterian Hospital and serve in their teaching capacity at both institutions.

It is gratifying to record that four third-year medical students elected special training in psychiatry during the year. These students attended all conferences, lectures, supervisory sessions, and also were allowed, under faculty supervision, the privilege of initial conduct of consultation requests and some experience in therapy. Dr. Robert Weiss was awarded a National Institute of Health Career Teacher Trainee Fellowship and participated in various areas in the instructional program throughout the year. Through his energy the Friday Clinical Conferences were reorganized. Among those who conducted clinics were Dr. Otto von Mering from the University of Pittsburgh, Professor S. Wortis of New York University, Bellevue Medical Center and Dr. Lauretta Bender of New York State Department of Mental Hygiene.

Professor Robert Senescu and Dr. Robert Weiss visited during the year the University of Rochester, New York, Western Reserve University, and the University of Pittsburgh to study the instruction in graduate and undergraduate psychiatry, and Professor Donald Dunton visited the Children's Hospital and the Judge Baker Foundation for Child Psychiatry in Boston.

The research seminars, conducted at the Psychiatric Institute, were directed this year to the general subject of schizophrenia. Professor Bernard Holland, who organized the seminars, had as visiting discussants Professor Theodore Lidz of Yale University, Professor Silvano Arieti of the Long Island Medical College, and Dr. Lauretta Bender. Also, a research colloquium was initiated for the research staff of the Psychiatric Institute by Dr. Joseph Schachter late in the spring.

During the year the department suffered the loss through retirement of Professors Lawson Lowrey and Nicholas Kopeloff. It is gratifying that Professor Lowrey has been willing to continue to offer some service and both he and Dr. John A. P. Millet have accepted appointments as lecturers in the department.

During the year Professor Harold J. Strecker accepted an appointment at the Albert Einstein College of Medicine as associate professor of biochemistry. Professors Bruce Buchenholz and Milton Sapirstein and Drs. Janet Kennedy, Charles W. Socarides, and Samuel L. Feder resigned.

The Psychoanalytic Clinic was grieved at the death of Dr. Eugene Milch, associate psychoanalyst. His loss as a teacher and friend was deeply felt by all who knew him.

At the New York State Psychiatric Institute, the teaching and research activities of Professor Franz J. Kallmann and his associates (medical gen-

etics) remained focused on the psychogenetic aspects of human behavior. The longitudinal twin study projects of the department were continued, including those on aging and longevity, Dr. Lissy F. Jarvik; early total deafness, Diane Sank and Hans G. Furth; psychotic reaction syndromes in the deaf, Drs. Kenneth Altchuler, S. Edward Deming, Edna S. Levine, and John D. Rainer, Dr. Arthur Falek, Dr. Arnold Kaplan, and Martin H. Wodin.

Under the direction of Professor Carney Landis, the Department of Psychology of the Psychiatric Institute has continued its search for a way to standardize sensory and motor tests of relative efficiency of the central nervous system. The testing of patients receiving insulin coma therapy was continued.

Professor Zubin, in collaboration with Drs. Eugene I. Burdock and Samuel Sutton, is continuing to investigate the problem of prognosis in schizophrenia by sampling the physiological, sensory, perceptual, psychomotor, and conceptual behavior of newly admitted mental patients with specially devised techniques aimed at obtaining base lines of behavior at the time of admission. Techniques have also been developed to assay the pre-morbid level of the patient by means of case history analysis and to determine the behavioral changes accompanying the course of the illness by means of specially devised rating scales for registering changes noted by ward personnel, nurses, occupational therapists, psychologists, social workers, and psychiatrists. A newly devised focused interview is used by Dr. Kurt Salzinger and his associates to measure the level of affect present in the patients.

Professor Zubin's collaboration with various departments is continuing on the following research projects: a study of pupillary reflexes in psychiatric patients and normals by Mr. Gad Hakerem with Dr. Otto Lowenstein of the Department of Ophthalmology; an evaluation of selection procedures of candidates for training at the Columbia Psychoanalytic Clinic and a study of the outcome of psychoanalytic therapy with Professor Henriette R. Klein; an investigation of perceptual alterations following pallidectomy for the relief of Parkinsonism with Professor J. Lawrence Pool of the Department of Neurological Surgery; a study of feedback mechanisms in speech by Mr. Richard Chase with Professor Edmund P. Fowler, Jr., of the Department of Otolaryngology; and a study of the affective responses of normal institutionalized and schizophrenic patients with Professor Robert A. Senescu. Professor Zubin continued his teaching of experimental abnormal psychology and advanced abnormal psychology to graduate students at Columbia University, gave a course in personality measurement at the New York School for Social Work and received a traveling fellowship from the Commonwealth Fund to make a survey of biometric research in Europe during the summer of 1957.

Professor Heinrich Waelsch, in collaboration with Professor Abel L.

Lajtha, has continued to study protein metabolism of the brain and of the peripheral nerve. In collaboration with Dr. Howard Sachs, the study of amino acid incorporation in microsomal preparations in liver and brain has been continued. With Dr. Alexander Miller the work on the formimino transfer reaction has been concluded and the mechanism of urocanase action has been elucidated, in part. The study of the biosynthesis of the imidazole ring of histidine in *E. Coli* has been continued with Amos Neidle.

Professors Warren M. Sperry and Herbert L. Meltzer have followed the rapid labeling of brain fatty acids and all of several fractions separated from the unsaponifiable lipides following the injection of acetate- l -C¹⁴ into the subarachnoid space of rats. Professor Benjamin Weiss has succeeded in synthesizing dihydrosphingosine- l -phosphate and several other phosphorylated sphingosine derivatives.

Professors Gedeon Eros and Mavis Kaufman have assisted in the teaching program for postgraduate courses as well as for the state hospital resident training course. Professor Roizin is continuing his comparative histologic and electron microscope studies of the various cytologic constituents of the central nervous system. In collaboration with Professor Irville H. MacKinnon and Dr. Reginald M. Taylor, Professor Roizin has under study the chronic effects of isonicotinic acid hydrazide upon the central nervous system in monkeys. Drs. Mary M. Knight, True, and Donald B. Douglas have assisted in various phases of the experimental investigations. Dr. David N. Graubert and Professor Roizin are investigating also the effects of prolonged administration of LSD 25 to macacus rhesus monkeys. The clinical observations are supplemented with electroencephalographic examinations.

Professor Bernard Holland continued his investigations of the metabolic disturbances in psychotic patients, particularly in relation to the activity of the adrenal cortex in schizophrenia. Patients with chronic schizophrenia who develop carcinoma of the breast have been treated by bilateral adrenalectomy. During operation adrenal vein blood has been collected and subjected to differential analysis of adrenal steroids. Following adrenalectomy the effect of varying doses of steroids on the patient's behavior is observed. This work is being done in collaboration with Professor Perry B. Hudson and Dr. Michael Lombardo of the Department of Urology.

In collaboration with Professor Marcel Goldenberg and Dr. Gerald Cohen of the Department of Medicine, Professor Holland has pursued a study of psychiatric symptomatology reproduced by infusion of adrenalin and nora-drenalin. They have also been studying the metabolism of adrenalin.

As a means of evaluating various "tranquillizing" agents, a clinic has been established in the Vanderbilt Clinic under the leadership of Dr. Sidney Malitz, assisted by Drs. Murray Glusman, John O'Connor, and Graubert. The collaborative human and animal psychosurgical research with Professors J. Lawrence Pool and Joseph Ransohoff of the Department of Neuro-

logical Surgery continues. Dr. Reginald Taylor and Professor Sperry are pursuing their studies of the interrelationship between physiological characteristics and biochemical states of the isolated perfused brain in the living monkey. With Professor Kallmann studies are underway on the electroencephalographic findings in a family of patients with Huntington's Chorea and their near relatives.

Dr. Lenore Kopeloff and her staff has continued the study of chronic experimental epilepsy produced in the monkey by the alumina cream technic. Determinations were made of minimal quantities of certain drugs required to produce clinical convulsions in normal and epileptic monkeys. An investigation of epilepsy produced in infants and immature monkeys by intracerebral alumina cream also is under way, in collaboration with Professor William F. Caveness of the Department of Neurology. A long-term study is in progress to determine the possible epileptogenic effects of pure metals implanted in the precentral motor cortex of the monkey. Dr. Joseph G. Chusid of St. Vincent's Hospital has collaborated in the above projects.

Professor Leon Moses, in collaboration with Professor Edmund M. Goodman of the Department of Surgery, has perfected a three-lumen-naso-gastric tube and this device has been tested on a series of peptic ulcer patients. It is now ready to be used in a long-range psychoanalytic and physiologic study of a case of duodenal ulcer. Professor Moses, with a group of students from the Psychoanalytic Clinic for Training and Research, is studying psychodynamic and psychotherapeutic factors in a series of cases with obesity who are undergoing intensive psychoanalytic therapy. Also, he is continuing the long-range study of psychogenic factors in a series of cases of essential hypertension. Dr. Joseph Lubart, in collaboration with Professor Sidney Werner of the Department of Medicine, is investigating psychiatrically patients with nontoxic thyroid disease as compared with individuals with no thyroid disease. Dr. Alfred Messer is working in the special asthma clinic, associated with the Department of Medicine, in a study of the emotional component of this illness. Dr. Lothar Gidro-Frank, in cooperation with the Department of Obstetrics and Gynecology, is nearing completion of this study of psychodynamic factors in pelvic pain. Dr. Joseph Schachter has formulated an investigation designed to study the congenital predisposition to anxiety of newborn infants.

Professor William A. Langford, with others in the Babies Hospital, have continued their studies of anorexia nervosa in late preadolescent and early adolescent girls.

Professor William A. Horwitz with Professors Paul Hoch, Lawrence C. Kolb, and Phillip Polatin have carried out a ten-year follow-up study of patients treated by direct analytic therapy.

A research project on psychoanalytic therapy is under way, involving Professors Abram Kardiner, Lionel Ovesey, and Aaron Karush. Professor

Karush also is organizing a research program on the admissions service designed to investigate the factors which enter into prognostic predictions of patients who are accepted for treatment.

A long-term investigation to determine factors indicative of possible success in selecting candidates for training as psychoanalysts has been initiated. The study seeks to determine whether clear-cut predictions can be made, and on what grounds, concerning special aptitude for psychoanalytic therapy. Professors Henriette Klein and David Levy are working on this project with Professor Joseph Zubin.

Various honors and additional responsibilities have been bestowed upon and accepted by members of the department during the year. Professor Kallmann received an honorary degree from the University of Turin, Italy; Professor Waelsch was appointed by the Surgeon General of the U. S. Public Health Service a member of the Neurology Study Section of the National Institute of Health and was elected president of the Society of European Chemists; Professor Langford was elected president of the American Academy of Child Psychiatry; Professor Kolb was selected to give the Hutchings Lecture at the University of Syracuse and made a Consultant to the Surgeon General, in Public Health Service.

The members of the department received visitors from Australia, Sweden, Israel, Pakistan, India, China, France, England, Colombia, and various universities in the United States.

SCHOOL OF PUBLIC HEALTH AND ADMINISTRATIVE MEDICINE

Professor RAY E. TRUSSELL, Executive Officer

The development of the activities of the school in meeting the demands on school personnel to fulfill the responsibilities of community service, education and research continues actively. The faculty has accepted several new responsibilities. It is a pleasure again to emphasize our programs in psychiatric administration and maternity nursing with the Departments of Psychiatry and Nursing, respectively. The new training programs for statisticians and epidemiologists will help to meet a critical shortage of these specialized personnel. The new program in continuation education is the largest single new educational venture undertaken by the school. The entire subject of administrative medicine as a field of activity, a body of knowledge, and a curriculum is under study by an ad hoc committee consisting of faculty and experts in the greater New York area who are meeting monthly over an indefinite period of time to develop the entire subject.

The program of continuation education has been made possible through a generous grant from the W. K. Kellogg Foundation. Professors Harold Baumgarten and Mabel Ingalls have joined the faculty for the purpose of

developing the courses in hospital administration and in public health which are so badly needed by people who are occupying full-time responsible positions either in health departments or in hospitals. For example, there are over four thousand professionally trained public health workers in New York State and New York City alone. As another example, there are more than six hundred hospitals in the New England and Middle Atlantic States under 100 beds in size. These hospitals are the ones which have the most difficulty with administration because they do not as a rule support trained administrators. The first class in basic hospital administration was held in June of this year.

It is most gratifying to note that thirty-one hospital administrators in areas close to the small hospitals from which our first class has been drawn have accepted the responsibility of serving as preceptors for these relatively untrained persons who are taking this first course. Plans also are being developed for advanced courses for trained hospital administrators. This program for hospital administration referred to has received the utmost cooperation and friendliness from the American Hospital Association, the American College of Hospital Administrators, the Catholic Hospital system, and the leading publications in the field.

The development of short courses for public health personnel in New York and New Jersey has proceeded according to plans outlined in last year's report. Public health personnel in the White Plains region and in the New York City Health Department have answered questionnaires about their needs and the needs of their subordinate personnel. An advisory committee of the Commissioners of Health and their respective training officers in New Jersey, New York State and New York City has been appointed; the committee including outstanding persons from the voluntary health agency field. The committee has been of the utmost assistance in developing policy and resources for continued support of the program. The continuation education staff assisted the Office of Professional Training of the New York State Department of Health in holding a two-day Institute on Diabetes which was held in Albany, New York City, and Rochester. A program in management in public health was given at Bard Hall. Another institute on the structure of government in New York State has been developed for the fall and two courses on air pollution also have been scheduled for this fall.

A third, and important contribution, to international health work is an exchange professorship agreement worked out with the School of Public Health, and the University of São Paulo School of Hygiene and Public Health, São Paulo, Brazil. Under the terms of this agreement, three members of the Faculty of the School of Public Health and Administrative Medicine will spend the summer months in 1957, 1958, and 1959 in São Paulo, and three members of the faculty of the School in Brazil will spend winter

months here. The purpose is to strengthen the teaching of hospital administration in Brazil.

The research activities of the school continue to expand. Research personnel have increased in number to such an extent that additional space has been rented in an adjacent building. This is now known as the Research Unit of the School of Public Health and is administered by Professor Jack Elinson, who has joined the faculty for purposes of research development and strengthening the teachings of social sciences. Professor Elinson was formerly senior study director with the National Opinion Research Center and collaborated with the executive officer in carrying on the rural chronic illness survey for the Commission on Chronic Illness.

The work on voluntary health insurance coverage in New York State being done for the Joint Legislative Committee on Health Insurance Plans has continued. Mr. Frank Van Dyke has been responsible for this program under the general supervision of Professors Barnett and Trussell. He has been aided on a part-time basis by Mr. Joseph Lane.

Hospital-physician relationships and prepayment principles as they affect the quality of medical care continues to be a study of national scope by our staff and committee. The latter group consisting of approximately twenty-five prominent and experienced persons in the field of medical care, prepayment, hospital administration, organized medicine, and other groups concerned with this problem has been functioning in a group of subcommittee meetings and examining separate segments of the problem. Staff members, including Mr. Robert Ratajack, assistant in administrative medicine, and Mr. James Bryan, have been conducting literature research and managing the entire project under the general supervision of Professors Barnett and Trussell.

A substantial grant has been received from the Federal Hospital Council of the Public Health Service to study the quality of medical care under different organizational patterns. Dr. Milton Maloney has been appointed as project administrator under the general supervision of Professors Barnett and Trussell.

A new project for which the school has just been retained by the Employee Foundation is that of a national examination of union-management negotiated health plans. Dr. Josephine Williams has been appointed as research associate and will be project administrator for this national study.

A new foundation, the Employee Foundation for Health, Welfare and Medical Care, Incorporated, has been formed by the International Association of Machinists and the United States Industries, Incorporated, with Mr. A. J. Hayes and Mr. John Snyder as co-chairmen.

The school also has been retained by the Interdepartmental Health Resources Board of the New York State Government to evaluate the program of the Riverside Hospital for the treatment of juvenile narcotic addicts. Mrs. Charlotte Bunkin, a psychiatric social worker, has been retained to do

the fact-gathering part of the study under the supervision of Professors Trussell and Elinson.

The school is fortunate in that consultant services are available to several of its studies through Martin Segel, Incorporated. This places at our disposal a large organization of people with specialized skills in the medical care field which could not possibly be available on a full-time basis in the University.

The Alumni Association has been increasingly active. The Association is becoming more of a unified group as the traditional barriers between hospital administration and public health administration crumble. The Association has developed an attractive and informative newsletter which appears quarterly. The editor is Mrs. Beulah Gutenstein. A permanent executive secretary, Mr. Harold Baumgarten, has been appointed. The alumni have also been of great assistance to the student body and have expressed the utmost interest in their activities. A reception jointly sponsored by the faculty and the Alumni Association started the school year off in a friendly atmosphere.

During the past year Professor Trussell has served as chairman of a Committee on Hospital Planning of the American Hospital Association and as vice-chairman of a council on hospital planning. He has functioned as chairman of the Council on Community Service and Education of the American Heart Association; as chairman of the Resolutions Committee and a member of the Program Committee of the American Public Health Association. He is a member of the temporary Health Insurance Board for State Employees and the executive Committee for the Association of Teachers of Preventative Medicine.

The school provides approximately half of the instruction in the new program of maternity nursing offered by the Department of Nursing. Further details of this program can be found in Professor Lee's report since the primary enrollment of all of these students is in the Department of Nursing.

The cooperative relationship between the Department of Psychiatry and the school continues to grow constructively. In addition to the course required of all students in the School of Public Health last year, an additional required course has been added and elective courses for the full-time students are available. These courses are organized or taught by Dr. Mottram Torre.

A decision has been reached to survey the mental disease problems in a demarcated urban area surrounding the Columbia-Presbyterian Medical Center and to develop a community psychiatry program for teaching, research, and service. Like all other mental health work in the school it will come under the umbrella of the proposed division of community psychiatry to be headed by Professor Viola Bernard of the Department of Psychiatry.

A training course for psychiatrists in psychiatric administration was instituted this fall. The course leads to a Master of Science degree in administrative medicine. Three psychiatrists have completed the first two quarters of

academic residence and have returned to their former posts in public mental hospitals for their year of supervised administrative residency. The course is designed to prepare candidates for administrative posts in mental hospitals, clinics, and community mental health programs.

The School of Public Health and Administrative Medicine and the Department of Psychiatry have simultaneously undertaken a more comprehensive joint training program at two other levels. Content in psychiatric administration and community psychiatry has been introduced at the level of the psychiatric residency program; and selected psychiatric residents simultaneously fulfill the requirements of the three-year psychiatric residency in the Department of Psychiatry and the academic requirements for a Master of Public Health degree in the School of Public Health and Administrative Medicine.

Preparatory to this pioneering project a curriculum advisory committee for the course in psychiatric administration was formed under the chairmanship of Professor Paul W. Hoch of the Department of Psychiatry. Miss Mildred Scoville, who served as consultant for the preparation of the course, has conferred with a good many experienced people in the field as to the basic functions and training needs appropriate to our curriculum.

Dr. Mottram Torre has served as psychiatric consultant to the United Nations Medical Service. He also is a special consultant to the World Federation for Mental Health. He represents the National Association for Mental Health on the International Social Welfare Committee of the National Social Welfare Assembly. He has been appointed a member of the subcommittee on peaceful uses of atomic energy of the World Federation for Mental Health; a member of the Governing Board of the International Committee for Mental Hygiene; a member of the advisory editorial board of the *International Journal of Social Psychiatry* and contributing editor to the *International Journal of Group Psychotherapy*.

DIVISION OF BIOSTATISTICS

In addition to the usual teaching activities of the division for students in the school, staff members of various departments of the medical school and medical students in the first and third years, the division has assumed a new and greatly needed program of training statisticians.

A grant has made possible the addition to the staff of Dr. George L. Saiger as assistant professor of biostatistics, as well as the offering of fellowship stipends to students working in the field of biostatistics.

Dr. Agnes Berger has continued her research on appropriate methods of evaluating follow-up data, and has studied the applicability of various multi-comparison techniques in medical research. Professor John W. Fertig has continued his collaboration with Professor Neal Chilton on statistical

methods in dental research and has continued his study on methods for assessing the results of repeat experiments. Professor Saiger has been studying bioassay techniques, the applicability of certain multivariate techniques to medical research, and has continued his research with investigators of the Rand Corporation of Santa Monica on the biological effects of radiation and on linear programming.

The division has participated in approximately one hundred consultations with the research workers in various divisions of the Medical Center and of the New York State and City Health Departments.

Professor Fertig has continued his close cooperation with the Family Health Maintenance Demonstration at Montefiore Hospital. He has served also as a member of the Advisory Committee on Research on Therapy of Cancer of the United States Public Health Service.

In addition to the usual meetings and seminars, the division has continued to assist in international health work. Professor Fertig spent six weeks in São Paulo, Brazil, two weeks in Santiago, Chile, and one week in Mexico, giving lectures and seminars in biostatistics to staff members of the medical schools, schools of public health, and various research institutes. This activity was under the auspices of the Pan-American Sanitary Bureau.

DIVISION OF EPIDEMIOLOGY

The division, in addition to its usual heavy teaching duties, has been particularly concerned with the epidemiologic aspects of cardiovascular diseases. Professor E. Gurney Clark and his colleagues have published a series of six reports in the *Journal of Chronic Diseases*, bringing into focus the results of several years of their work on the epidemiology of hypertension.

An Epidemiology Planning Committee for Cardiovascular Diseases has been organized. The committee is staffed by Mr. Dean Krueger on loan from the National Heart Institute for two years.

Professor Clark has also studied the work being done on the epidemiology of atherosclerosis and hypertension in England and Norway. Professor Clark and Professor Hugh R. Leavell of the Harvard School of Public Health have revised their *Textbook on Preventive Medicine* for the second edition.

In view of the critical shortage of trained epidemiologists in this country, it is a pleasure to report that the division has been awarded a training grant to recruit and train this specialized category of research personnel.

Professor Clark is currently vice-chairman of the epidemiology section of the American Public Health Association, chairman of the Symposium Committee of the American Public Health Association, and a member of the Expert Advisory Panel on Venereal Diseases and Treponematoses of the World Health Organization.

DIVISION OF HEALTH EDUCATION

The division is greatly strengthened by the recent appointment of Professor George Rosen to full-time status. Professor Rosen has been selected to serve as editor of the *American Journal of Public Health*.

A new type of orientation program for our students was inaugurated this year under Professor Rosen's chairmanship. In order to assist out-of-town students an intensive nine-day orientation program was inaugurated. Professor Rosen participated in many meetings, such as the Cooperative Health Federation of America and the International Congress for Health Education of the Public Health Advisory Group. He also presented a discussion of medical history at the Albert Einstein Medical School; presented a paper on the origins and development of community health action at the Thomas More Institute for Adult Education in Montreal; lectured at the Harvard University School of Public Health, the Walter Reed Hospital Institute for Research, and the annual meeting of the Medical Library Association in New York City.

DIVISION OF HOSPITAL ADMINISTRATION

In addition to previously time-tested courses in hospital administration attended by forty graduate students (hospital administration, administrative medicine), a new method of rounding out the teaching of basic hospital administration was developed this year. It was what may be termed a three-dimensional approach to education. It consisted first of a series of lectures and assigned reading in order that the student might obtain basic information on hospital organization and structure. The second dimension was the development of administrative clinical clerkships within seventeen hospitals in this area. The third dimension was group discussion: The class was divided into three groups representing approximately ten hospitals in the clinical clerkship assignment and the same subjects were discussed in these groups of ten. The students were able to discuss the variation in planning and operation of the various departments found in the various institutions.

A new course was initiated this year on the role of the administrator, the purpose of this being to emphasize his importance in institutional and community planning. Also, as a usual part of the curriculum a field-trip program came between the third and fourth quarters during which the students in hospital administration and administrative medicine visited Washington, D.C., for four days.

Research in the development of case material was concluded in June, 1957. Mr. George Billington participated actively in teaching during the third and fourth quarters.

Professor Barnett's work on a textbook in hospital administration is well along and it is contemplated that the textbook will be ready for publication

in the fall of 1957. Mr. Rudolf Pendall is preparing the basic material for this book.

The program on student selection for a career in hospital administration by Drs. Mottram Torre and Ruth Bishop Heiser continued. Several other university programs in hospital administration are cooperating in this project, which should continue another two years to secure sufficient numbers of students.

The study on convalescent care, mentioned in last year's report, continued under the able direction of Dr. Magda P. Shorney, with the help of Miss Virginia Brown.

Professor Clement C. Clay was appointed a member of the hospital and Institution Review Committee of the New York City Department of Health. He served on the Nursing Service and Education Committee of the Hospital Association of New York State and on a joint committee of the Association of University Programs in Hospital Administration and the Blue Cross Commission to develop teaching materials for use by the universities.

Professor Barnett continued to serve as a member of the Board of Trustees of the National League for Nursing; delegate to the National Health Council; member of the Committee on Extension of Hospitals and Other Facilities of the American Medical Association; member of Advisory Committee on Hospitals of the W. K. Kellogg Foundation. He also served as a member of the Board of Trustees of the Health Insurance Plan of Greater New York; chairman of a Research Committee of the American Hospital Association; and a member of the Research Committee of the Association of University Programs in Hospital Administration. He was a member of the Board of Trustees and of the Master Plan Committee of the Hospital Council of Greater New York; and Secretary-Treasurer of the American Association of Hospital Consultants.

The division calls on the service of many part-time faculty members and visiting experts. Some of the guest lecturers during the year have been:

George Baehr, M.D., president and medical director, Health Insurance Plan of Greater New York

James Berkman, M.D., pathologist, Long Island Jewish Hospital, New Hyde Park, New York

Newman M. Biller, executive director, The Home for Aged and Infirm Hebrews of New York

Dean Conley, executive director, American College of Hospital Administrators, Chicago, Illinois

Peter Rogatz, M.D., associate director, Division of Professional Services, Health Insurance Plan of Greater New York

Charles W. Davidson, director of General Hospital, St. Luke's Hospital, New York City

C. Boardman Thompson, The McBee Company, Boston, Massachusetts

- R. L. Trambici, International Business Machines Corporation, New York City
William A. Gately, executive director, Hospital Bureau of Standards and Supplies, New York
James M. Hershey, M.D., hospital consultant, New York State Department of Health, Office of Medical Defense
John W. Kauffman, administrator, Princeton (New Jersey) Hospital
Walter C. Kirschner, U.S. Hoffman Machinery Corporation, New York City
Leland K. Mamer, director of buildings, St. Luke's Hospital, New York City
Miss E. Alliene Mosso, supervising dietitian, St. Luke's Hospital, New York City
Mrs. George A. Perera, president, Women's Auxiliary of Presbyterian Hospital, New York City
Stanford Pulrang, M.D., urologist, St. John's Riverside Hospital, Yonkers, New York
Anthony J. J. Rourke, M.D., hospital consultant, New Rochelle, New York
Harvey Schoenfeld, director, Barnert Memorial Hospital, Paterson, New Jersey
Raleigh L. Smith of Will, Folsom and Smith, New York City

In addition, many members of the staff of the Presbyterian Hospital and of the faculty of the College of Physicians and Surgeons delivered lectures.

DIVISION OF OCCUPATIONAL MEDICINE

In the graduate teaching program a new course on the public health aspects of radiation was introduced as an elective. It was organized by Professor Irving R. Tabershaw, who is also director of health and safety of the Nuclear Development Corporation of America.

Medical student teaching in preventive and administrative medicine continues to be carried on by the faculty with Professor Leonard Goldwater as the program coordinator. A series of four field visits to the Division of Social Medicine at Montefiore Hospital was arranged for each student. The field work is preceded by an orientation period and is followed by a general discussion period held at the school. Representatives of Montefiore Hospital are present at each of these.

Through the cooperation of the Westchester County Department of Health, it became possible to have each third-year student spend an afternoon in the field with a public health nurse in that organization.

With respect to research activities, a study of the mechanism of anemia in lead poisoning, in collaboration with the Division of Industrial Hygiene of the New York State Department of Labor, was continued with Professor Goldwater as responsible investigator.

Analysis of records covering a fifteen-year study of the occupational

potentialities of persons with heart disease has been continued by Professor Beatrice Mintz under the direction of Professor Goldwater.

A long-range study of a group of workers exposed to mercury vapor has been started and is expected to continue for several years. This study is unique in that practically continuous observations are being made on the atmospheric levels of mercury vapor and these are being correlated with mercury excretion and monthly physical examinations. The study is being supervised by Professor Goldwater.

DIVISION OF PARASITOLOGY

The teaching programs in the School of Public Health and Administrative Medicine and in the medical school have continued along the lines developed several years ago. The availability of the Tropical Diseases Diagnostic Service of the New York City Health Department has added greatly to the instruction. Professor Howard B. Shookhoff and Dr. Max M. Sterman have been of great assistance and their cooperation in the instruction of medical and public health students is greatly appreciated.

Two graduate students are working for the Ph.D. degree in parasitology under the aegis of the Graduate Faculties. Both have fellowships from United States Public Health Service sources.

Professor Harold W. Brown continued his active cooperation with the various departments of the medical school. He participated in ward rounds, clinics, and clinical-pathological conferences with the Departments of Pediatrics, Medicine, Ophthalmology, Surgery, and Neurology.

Three fourth-year medical students took their medical elective in the Aluminum Company of America Hospital in Surinam under the guidance of the Division of Parasitology. These students served as interns in the hospital. Their research project involved the study of the Diego and other blood factors in primitive Indians. Blood from over 170 Indians was secured from tribes living near the Brazilian border. Malaria studies were also made on this group.

As in previous years, a number of missionaries spent from one to four months in the parasitology laboratory, where they were given practical instruction in the diagnosis and treatment of parasitic diseases. The missionaries were Dr. Philip D. Anderson, Celebes, Indonesia; Miss Doris Schultz, Lutheran Mission Board; Miss Edith Waterman, Sudan Interior Mission; Dr. Christiana J. Yates, U.S. Presbyterian Board, Iran; Miss Avis D. Kint, Sudan Interior Mission, Nigeria, West Africa.

Dr. M. F. Basseres, professor of parasitology of the Medical School in Rio de Janeiro, Brazil, visited the department for two months and reviewed teaching and laboratory diagnosis of parasitic diseases. Dr. J. Pelagrino, professor of parasitology at the Medical School in Belo-Horizonte, Brazil, spent some time in the parasitology laboratory. Both of these physicians held International Cooperative Administration Fellowships.

Professors Brown and Kathleen L. Hussey and Dr. Kam-Fai Chan have continued their studies in the chemotherapy of helminthiasis. A grant from the United States Public Service has enabled the group to make fundamental studies on the biology of the pinworm and the host-parasite relationships. Two graduate students are cooperating in these studies.

Professor Brown and Dr. Sterman are cooperating in a study of several parasitic diseases found in patients of the Tropical Diseases Diagnostic Service of the New York City Health Department. They have obtained excellent therapeutic effects with a new drug in strongyloides infection. They found *Echinococcus granulosus* cysts present in several members of a family who brought an infected dog into this country from an European endemic area.

Professors Shookhoff and Hussey are studying the mode of action of iodoalphonic acid on tapeworms.

Professor Brown continued to serve on the Board of the New York State Medical Examiners and was elected president of the group. Professors Brown and Hussey and Dr. Chan continued to assist the administration of the New Jersey Training School in the control of amebiasis and enterobiasis in that institution. Professor Hussey has continued her summer studies on the larval stage of trematodes at the University of Michigan Biological Station with Dr. W. W. Cort, research professor of parasitology of the University of North Carolina.

Professor Roger W. Williams was awarded a senior postdoctoral National Science Foundation Fellowship and a Rockefeller Foundation travel grant for study in England and Scotland. He earned the Certificate of Applied Parasitology and Entomology from the London School of Hygiene and Tropical Medicine. Professor Williams served as vice-chairman of the Medical and Veterinary Section of the Entomological Society of America and a member of the Corporation of the Bermuda Biological Station for Research.

DIVISION OF PUBLIC HEALTH PRACTICE

The Division of Public Health Practice has continued to be involved in a variety of teaching responsibilities for various types of students with primary enrollment in the School of Public Health and Administrative Medicine, Dental and Nursing Schools, and Teachers College.

A change in the teaching schedule has provided the opportunity to teach public health practice on the base of completed courses in epidemiology, statistics, sanitary science, public health education, and administrative medicine. The division is fortunate in having the part-time assistance of Dr. George James, Deputy Commissioner of the New York City Department of Health, and adjunct associate professor of public health practice; Dr. William Brumfield, Commissioner of Health of Westchester County, adjunct associate professor of public health practice and Dr. William Donovan,

Regional Health Director of the White Plains Region, lecturer. Along with Dr. Joseph Kinnaman, Deputy Commissioner of the Nassau County Health Department, and Dr. Michael Antell, Director of the District Services of the New York City Department of Health, these additional practitioners have added greatly to the depth and variety of practical experience available to the students throughout the public health practice courses.

Between the third and fourth quarters, students taking the public health practice courses went in small groups to nearby communities where they spent three days observing the community's health services under the guidance of the local health officer.

Professor William C. Spring has continued to serve on the committee concerned with the program for maternity nurses offered jointly with the Department of Nursing.

Professor Margaret W. Barnard has continued to act as liaison with the faculty of the Department of Nursing in helping to plan the public health teaching program for the first-year student nurses and to secure either faculty or outside specialists to conduct the sessions.

Professors Barnard and Chilton were assigned to work out with Professor Frances A. Stoll of the Department of Dental and Oral Surgery ways in which student dental hygienists can be given the public health content recommended as necessary for this category of personnel.

The division has helped with the development of the program of continuation education in public health as an integral part of the school. Professor Barnard spent considerable time early in the year with Professor Mabel Ingalls in the exploratory phases of the project.

Professor Spring has served as a member of the Program Planning Committee of the Institute on the Structure of Government. Professor Barnard has continued to participate with Dr. Torre in the second-quarter course in human behavior and the third-quarter course on the elements of mental health, as one means of integrating content and interest in mental health concepts into public health practice. It appears that there are values for the students in this type of informal joint approach of the psychiatrist and the administrator as a team.

Under the guidance of Professor Chilton three dentists have been pursuing special studies in the field of dental public health administration. Services which the division members render to various community agencies on the local, state and national levels has continued to take a considerable portion of time of each member of the division. This time is amply justified by the enrichment that it provides in current problems and methods for the student teaching programs.

Professor Spring has also continued to serve on the Public Health and Sanitation Committee of the Commerce and Industry Association of New York City and as a member of the Metropolitan Chapter of the American Society for Public Administration. Professor Spring has continued as an

active participant in the University Seminar on the Role of the Health Professions, serving this year as a member of its executive committee. New community service assignments undertaken by Professor Spring include the vice presidency of the Public Health Association of New York City and the chairmanship of its Committee on Discussion Groups.

Professor Barnard has continued to serve as a member of the Public Health Committee of the Medical Society of the County of New York, the Committee on State and Local Health Councils of the National Health Council, as consultant to the Training Committee of the Department of Health of the City of New York, and as chairman of the Health Officers Section Committee on Professional Education of the American Public Health Association.

Professor Barnard continued to devote time to the work of the Community Mental Health Committee and has worked with Professor Lawrence C. Kolb of the Department of Psychiatry in integrating the former work of the committee into a broad new project leading toward community psychiatry in the Washington Heights area, and planning toward supporting community organization in this same area.

Professor Spring has continued to serve as study director of the School Health Survey of New York City under the Community Council of Greater New York. Professor Spring has been working with one of the currently enrolled students, Mr. Harry Steigman, and with Professor Ingram of New York University on further development of a punch card system for recording and analysis of field activities in sanitation for local health departments.

Professor Chilton has continued as principal investigator under contract between the Office of Naval Research and Columbia University on the design and analysis of dental research studies.

DIVISION OF SANITARY SCIENCE

Professor Alvin R. Jacobson was on active duty with the United States Public Health Service from June to February, 1957. He is returning to active duty in 1957 to review and re-evaluate an extensive program of in-service training in air pollution and radiological health. In addition, Professor Jacobson participated extensively in the teaching and field activities of the training program.

Professor Jacobson and two students working for the Master of Public Health degree have been making a survey of all the state and territorial health departments to determine the extent of housing regulations and programs pertaining to the owner-occupant type of dwelling. Professor Jacobson during the past year made an exhaustive study concerning the effects of boron hydrides and their combustion products on humans and plants. Professor Jacobson's interest is with regard to the extremely toxic effects of some of these chemicals being released into the atmosphere. He is consultant to the Interstate Sanitation Commission to analyze, coordinate,

and interpret data and provide a complete report covering the available information on the subject of air pollution in the New York-New Jersey metropolitan area. He also is a member of the Committee on Air Hygiene, Engineering and Sanitation Section of the American Public Health Association.

DEPARTMENT OF RADIOLOGY

Professor WILLIAM B. SEAMAN, Executive Officer

Several changes have occurred in the staff of the department during the past year. Professor William B. Seaman, who joined the staff at the beginning of the academic year, succeeding Professor Harold W. Jacox, who as acting executive officer had contributed greatly to the maintenance of morale and high professional standards of the department during the interim period. Dr. Catherine J. Dalton resigned to become director of the Radiology Department at New York Infirmary for Women and Children, and Dr. James M. Monaghan left to enter private practice. Dr. Robert J. Hochstim, a former resident here, was given an appointment as instructor.

Professor Jacox is still serving as co-editor with Professor Morton M. Kligerman of the Radiation Therapy Section of the *Year Book of Radiology*. With Professor C. Zent Garber of the Department of Pathology, he continued a study of the effects of radiation on bone, and with Professor Fred Vance Lucas, a study of radiation effects of normal and cancerous tissue removed at autopsy. He is investigating the clinical results of radiation therapy of cancer of the larynx and of the urethra. He is also writing a chapter on radiation therapy for a forthcoming book on lung and mediastinal tumors.

Professor John Caffey gave the Mackenzie Davidson Memorial Lecture before the British Institute of Radiology in London in December, 1956; The Preston M. Hickey Memorial Lecture at Wayne State University, Detroit, Michigan, in March, 1957; and the Ross Golden Memorial Lecture at the New York Academy of Medicine in April, 1957. As a result of his intensive studies of the roentgen features of the normal infant, Professor Caffey published a number of papers on the ossification of the pubic bones, the appearance of the ischiopubic synchondrosis, and the normal variations of the acetabular angles at successive periods during infancy.

Professor Juan M. Taveras continues to work with Professor Edward B. Schlesinger of the Department of Neurological Surgery on the development and improvement of diagnosing brain tumors by using radioactive isotopes. He is writing a chapter on the roentgen examination of the abdomen that will appear in *Diagnostic Radiology*. Professor Taveras is also collaborating in the preparation of a book on clinical neuroradiology. He was visiting professor of radiology at the Cincinnati General Hospital in May, 1957.

Professor Taveras also gave a postgraduate course in April, 1957, on neuro-radiology and cerebral angiography, and brain tumor diagnosis at the New England Center Hospital of Boston, Massachusetts.

Professor Josephine Wells is investigating the problem of sclerosis in vertebral bodies with Dr. Frederick S. Craig of the Department of Orthopedic Surgery. Dr. F. Mitchell Cummins has been reviewing the radiology curriculum in the medical school in an attempt to effect greater integration of this subject with the pre-clinical and clinical departments. Dr. Jerome Nadelhaft is collaborating with Dr. William A. Bauman of the Department of Pediatrics in investigating the roentgenographic appearances of premature infants.

Professor Kligerman is continuing his experiments with Dr. Daniel M. Shapiro of the Department of Surgery on the augmentation of radiotherapeutic effects by multi-combination cancer chemotherapy. Professor Kligerman and Dr. Norah duV. Tapley are working with Dr. J. J. Jacobson and Professor Ferdinand F. McAllister of the Department of Surgery in investigating the effects of adrenal irradiation on experimentally produced ascites in dogs. Professor Kligerman and Dr. Tapley are also continuing their study with Professor Algernon B. Reese of the Department of Ophthalmology and Dr. George A. Hyman of the Department of Medicine in investigating the treatment of retinoblastomas alone and by triethylenemelamine and irradiation. Professors Kligerman and Virginia K. Frantz of the Department of Surgery are continuing research on a study of carcinogenesis from external and internal radiation in the thyroid. Professor Kligerman continues as a consultant to the editor of *Cancer Yearbook*.

Professor Gerhart S. Schwarz continues his studies of cephalopelvimetry and has published several papers and given several lectures on this subject. He is also conducting studies of single-coated x-ray films. Professors Schwarz and Seaman, with Professor Harold H. Rossi and Miss Ginette Jacob, are investigating the radiation received by patients during diagnostic exposures. Dr. Ralph Schlaeger is evaluating the clinical experience in the use of intravenous cholangiography.

Professor Arnold Bachman is continuing his studies on intra-osseous venography with special reference to the azygous system in an attempt to distinguish between benign and malignant tumors and to determine operability. Certain aspects of the radiographic appearance of the larynx are being studied by Professor Bachman and he is also investigating the technique of the roentgenographic diagnosis of colonic polyps.

Professor Ruth Guttmann is continuing her clinical evaluation of the results of supervoltage therapy and is also studying the possibilities of sterilizing lymph nodes in mammary carcinoma. She also has been evaluating comparative results of the treatment of neoplasms with conventional 250 KV irradiation as compared with 2 MEV irradiation.

The activities of the Radiological Research Laboratory have been divided

been investigating fundamental problems in radiological physics and radiobiology for the Atomic Energy Commission and problems related to therapeutic radiology and clinical uses of radioactive isotopes. Professor Gioacchino Failla, Mr. W. Gross, and Mr. Bruce R. Allen have been measuring tissue doses produced by radioactive isotopes. New tissue equivalent conducting plastics are being developed in cooperation with Dr. Shonka of St. Procopius College and Dr. Rose of the Argonne National Laboratory. New types of ionization chambers and electrometers are also being developed. Further, Professor Failla, Mr. Gross and Mr. Allen are studying the protective effect of splenic plasma when injected intravenously into irradiated animals.

The work of Professor Harald H. Rossi, Dr. Ruth F. Hill, and Mr. Walter Rosensweig on tissue equivalent ionization chambers for neutron dose measurements is passing from the research to the technological stage.

Acquisition of a 256 Channel Differential Analyzer has aided greatly in further studies of the linear energy transfer of radiation. The L.E.T. distribution of a number of neutron sources has been evaluated, both at this laboratory and at a facility at the Argonne National Laboratory. Extensive studies of the properties of the plaque-type mutant T_{1s} , discovered by Dr. Hill last year have been carried out. Professor Roberts Rugh is continuing his research in lethality studies, effects of radiation on the gonads, and the effects of radiation on the fetus. Professor Rugh has also been carrying out studies of the effect of radiation on the developing nervous system of the fetus.

Professor Rossi and Mr. Francis deFriess have developed an optical back pointer to be used with the betatron. They are also developing a variable aperture for the betatron to permit greater flexibility in treatment areas. Professor Rossi has been appointed Radiation Protection Officer for Presbyterian Hospital and has established a central film badge service for all individuals who might be exposed to significant amounts of radiation and where exposure records of these people are kept. A radiation survey of all the x-ray installations of the Presbyterian Hospital is being undertaken. Professor Rossi is also continuing to study the precise measurement of the output of the betatron.

Professor Failla has continued to serve as chairman of the Radioisotope Committee of the Medical Center. Professor Edith H. Quimby is also a member of this committee. Professor Failla also continues to be active in work with the Atomic Energy Commission and other government agencies, both civilian and military, on problems related to atomic energy. He is chairman of the Advisory Committee for Biology and Medicine of the Atomic Energy Commission and consultant to several of the Atomic Energy Commission installations.

Professors Failla and Quimby received the annual national award of the American Cancer Society at the Society's annual meeting in November,

1956, for their studies on radiation dosage. Professor Quimby is a member of many advisory committees dealing with isotopes, radiation protection, and advanced education in the several fields of radiotherapy.

Professor Rossi is chairman of a subcommittee of the National Committee on Radiation Protection on Neutron Protection and has completed the draft of a handbook on that subject.

Professor Rugh is a member of a subcommittee of the National Committee on Radiation Protection on Standards and Measurements of Radioactivity for Radiological Use.

Members of the laboratory staff carry on various teaching activities. Professors Failla and Quimby continue to be members of the Subcommittee on Biophysics of the Joint Committee on Graduate Instruction. Seven students have now completed their work for the Ph.D. degree under this subcommittee and several others are in various stages of their courses. Instruction particularly for students in this field is offered by Professors Failla, Quimby, Rugh, and Rossi. The course in clinical use of radioactive isotopes under the joint leadership of Professors Quimby and Sergei Feitelberg, and with the cooperation of several guest lecturers, has been so popular that it has become necessary to offer it twice yearly.

In the fall and winter course of 1956-1957 and the June course of 1957, a total of sixty-five doctors received training. Professor Quimby continues to give regularly scheduled lectures in radiologic physics, and to supervise the work of the residents in radiology during their assignment to the Radioisotope Laboratory.

During the last year there have been three foreign students in the laboratory working on radiological physics problems. Professor Mario Chiozzotto of the Instituto Superiore di Sanita of Rome is spending a year with us to acquire practical experience in radiological physics and allied fields.

DEPARTMENT OF SURGERY

Professor GEORGE H. HUMPHREYS, II, Executive Officer

There have been few changes during the past year in staff, facilities, or organization of the teaching, training, and research programs of the department. This stability of organization does not reflect complacency, but has afforded an opportunity for consolidation of gains and re-appraisal of program. Joint committees of the faculty and hospital staff to review space allocation and staff function, and both inter- and intra-departmental committees of the faculty on curriculum have been actively engaged in exploring the many possibilities of improving the effectiveness of our program through better coordination of effort throughout the Medical Center and within the department.

The undergraduate teaching program, in particular, needs revision.

While the fourth-year clerkships, utilizing the opportunities for clinical training on the affiliated surgical services at Bellevue, St. Luke's, Roosevelt, and Mary Imogene Bassett Hospitals, have continued to justify the changes made two years ago, defects in surgical teaching in the third year have become increasingly evident. Change in the scope of surgery is also being felt in the introductory course in the second year with a widening of its traditional emphasis on processes of tissue reactions in inflammation and healing to include physiologic and biochemical alterations in relation to surgery.

Changes in the intern and resident programs begun two years ago have continued to demonstrate their value. The subdivision of the surgical service into three major and three minor divisions with the private service integrated into each, has proved an effective method of bringing private patient care into the training program. Many problems remain to be solved, however, if the trend away from the "charity teaching bed" is to be brought completely into harmony with the entire teaching program. Coordination of training in specialties or areas of special interest has been improved in our increasing use of the Delafield Hospital for teaching and training in cancer surgery, in the joint program with the Bellevue Chest Service in training in thoracic surgery, in the increasingly effective joint program with the Department of Otolaryngology in head and neck surgery, and in the establishment of short-term basic training in surgery for men entering surgical specialty residencies.

On September 1, 1956, Professor Robert Hiatt resumed his duties after a two-year leave of absence as director of the surgical service at the Nemazee Hospital in Shiraz, Iran. He has been actively exploring the possibilities or revision of the outpatient organization with the hospital administration and the staff. It is evident that there is a real need to use the abundant teaching possibilities of the clinic more effectively on both undergraduate and graduate levels, to the end that a better perspective of total surgical care can be taught in a less compartmentalized or "fragmented" manner than is now the case.

Professor Monroe A. McIver retired as clinical professor of surgery at the Mary Imogene Bassett Hospital in Cooperstown on July 1, 1956, and replaced Professor Hiatt in charge of surgery at the Nemazee Hospital in Shiraz. His place was taken by Dr. John Powers, who was appointed clinical professor on the same date. From January 6 to 12 Professor Humphreys visited the Bassett Hospital as "surgeon-in-chief protempore" while at the same time Professor Harold Zintel of St. Luke's Hospital visited the Presbyterian Hospital in the same capacity.

Miss Daisy M. Mapes retires June 30, 1957, from her post in Columbia University after thirty years of continuous professional work. For twenty-eight years she has been the supervisor of the experimental operating room in the College of Physicians and Surgeons, which is also a classroom for

courses in the teaching of surgery. Generations of P&S graduates have forgotten many of their teachers, but few will ever forget the hours spent under Miss Mapes' supervision in the animal hospital. Many of these students, medical and postgraduate, have taken her high principles as a goal for which to strive in other institutions, so her influence is widespread.

In the research laboratories, programs begun in previous years have continued. In addition to supervising the routine study of over ten thousand surgical specimens in the laboratory of surgical pathology, Professor Raffaele Lattes and his staff have carried out special studies of certain special groups of tumors, correlating the pathological findings with long-term follow-up studies. He published, with Dr. Carlo E. Grossi, a paper on carcinoid tumors of the stomach, and with Professors Robert H. Wylie, Frank P. Shepard, and Harold M. M. Tovell, of the Department of Obstetrics and Gynecology, a paper on endometriosis of the lung. He has also completed, with Professor Nathan Lane and Dr. James R. Malm, a study of malignant melanoma and is currently reviewing an unusually large series of tumors of the thymus gland. In addition he is collaborating with Professor Cushman Haagensen on a study of Paget's disease of the breast. With Dr. John R. Martin, Professor Karl Meyer, and Professor Charles A. Ragan of the Department of Medicine he reported an experimental study of the effect of cartilage and other tissue suspensions on reparative processes of cortisone-treated animals.

In the past year Professor Robert S. Grinnell and Professor Lane have compiled an analysis of benign and malignant adenomatous polyps and papillary adenomas of the colon and rectum, which is about ready for publication. Professor Grinnell has also completed an article on squamous cell carcinoma of the anus for a volume to be published shortly on the surgery of the colon and rectum. He has also collected data from the clearing of surgical specimens on the significance of lymph metastasis in the curability of cancer of the colon with late results on the value of high ligation of the inferior mesenteric artery at the aorta. The value of radical, total, or subtotal colectomy for cancers and polyps of the colon, which has been recently advocated, is also being analyzed in the light of our own experience. Professor Lane is assisting members of the resident staff in studies of ulcer-carcinoma of the stomach and lipochrome pigmentation of the small intestine.

In addition to conducting the second-year undergraduate course and the regular training program for residents, members of the surgical pathology laboratory have supervised the work of five postgraduate students throughout the year.

The laboratory for cell physiology, under the direction of Professor Margaret R. Murray has been both busy and crowded. Two visiting fellows have been added to the working group: Dr. F. Thomas Algard of Stanford University has been investigating by means of tissue culture the histogenesis of

two hormone-dependent tumors of the hamster; and Dr. Murray Bornstein of Mount Sinai Hospital, New York, has been developing methods of cultivating CNS tissues for experimental study of the demyelinating diseases. Dr. Stanley Crain of the Department of Neurology has continued as a member of the research group, in which he has developed methods of cultivating spinal cord for electrophysiological study. In November, 1956, Dr Arline Deitch concluded her post-doctoral fellowship awarded by the United States Public Health Service, and transferred to the Department of Orthopedic Surgery, where she is continuing her cytochemical work with Professor Gabriel C. Godman. In September and October, 1956, the laboratory had as a guest Dr. Louis René Rey, acting director of the Zoology Department of the Ecole Normale Supérieure in Paris, who was learning methods of cultivating nervous tissues in vitro. In April, 1957, the laboratory group was joined by Miss Ursula Bock of the Medizinische Universitäts Klinik, Marburg, Germany, who will be with us for two years on the State Department's Exchange Visitors program. Twenty-eight transient foreign visitors have been received so far during the year.

In her continuing study of nutritional factors governing the development of the dorsal root ganglion complex, Mrs. Edith Peterson has investigated the dependence of myelin sheath formation on the orientation and development of the Schwann cells enveloping the fiber and on the production of Nissl substance by the soma as well. In a direct chemical attack upon the problem of cytodifferentiation (in collaboration with Professor Chargaff), Mrs. Benitez has been able to bring about, on a quantitative basis, the morphological transformation of adult rat fibroblasts.

With Professors Alfred Gellhorn and Erich Hirschberg of the Department of Medicine, Mrs. Ruth Eising has been continuing a comparative study of the effects of chemotherapeutic agents upon human and mouse gliomas in vivo and in vitro.

Professor Cushman Haagensen has continued his efforts to identify and describe the factor in the milk of mice which produces breast cancer. Emphasis has shifted to tissue culture methods. In collaboration with Professor Murray and Professor Dan Moore of the Department of Microbiology, Dr. Extienne V. L. Lasfargues has successfully propagated this carcinogenic agent in cultures of normal embryonic mammary glands, and is attempting by electron microscopy and various physical and chemical means to identify and characterize it.

Under the direction of Professor Michael Heidelberger it has been possible to prepare in the rabbit by repeated inoculations of milk from tumor-bearing mice, an antiserum which has a powerful destructive activity on epithelial cultures of neoplastic tissue. Such in vitro tests are now being used to detect the specificity of various fractions isolated from the whole milk of agent-bearing mice.

Professor Edward L. Howes has continued his studies of bacterial en-

zymes and their possible usefulness in removal of necrotic tissue from wounds and burns. The experimental phase of this study is now concluding, and with the increasing availability of potent enzymes from outside laboratories, the phase of clinical trial has begun. In addition he has isolated quantitatively the mucoproteins derived from the 755 tumor in mice, and measured the amounts and types found in tumor tissue and in the blood of the host. The relationship of the sprouting of blood vessels to the capacity of tumors to survive transplantation has been investigated in a general program studying chemical changes that initiate or accompany the sprouting of capillaries.

Dr. Daniel Shapiro, with Professor LeRoy Dietrich and Dr. Maurice E. Shils, has this year expanded his studies on chemotherapy for cancer in collaboration with Professor Morton M. Kligerman of the Department of Radiology. They have studied the cure rates of breast cancer in mice following radiotherapy in conjunction with multi-compound chemotherapy as compared to cure rates following radiotherapy alone. Leads which have evolved from this combined attack on cancer are being followed in relation to other compounds and other animal tumors.

Professor Harold G. Barker has continued his studies in surgical physiology in the surgical metabolism research unit. Drs. Don O. Gore and Arnold Mittelman completed their periods of twelve months as full-time research fellows and Dr. Alan Merchant is spending a similar period. Dr. Robert Beals will shortly begin his fellowship. Drs. Keith Reemtsma and James R. Malm continued their work on a part-time basis while continuing clinical duties.

Professor Barker and Reemtsma and Malm have continued their studies of intestinal absorption of fat and fatty acid by an isotope tag method. Pancreatic disease and malabsorption states are of particular interest. Professor Paul A. di Sant'Agnese of the Department of Pediatrics and Professor Michael J. Lepore and Dr. John A. Wood of the Department of Medicine have collaborated in certain phases of this work. Drs. Merchant and Gore have been exploring the usefulness of arginine in combating the ammonia intoxication of hepatic coma both in the dog laboratory and at a clinical level. Dr. Shapiro is collaborating in this work. Drs. Mittelman and Gore are exploring the steroid physiology of the surgical stress reaction and of ascites formation and reabsorption in cirrhotics and patients with abdominal carcinomatosis. Interest has continued in the usefulness of the portacaval shunt operation in patients with ascites. Better selection of patients and methods of preoperative preparation are the goals of this study in which Professor Arthur H. Blakemore is also collaborating. An interest in water and electrolyte physiology in surgical patients has also been maintained. Six papers in scientific journals have appeared during the past year from the surgical metabolism unit and six presentations have been made at meetings of national societies.

Dr. John F. Prudden has carried his previous studies on the effect of growth hormone with or without insulin on nitrogen metabolism to the stage of clinical testing in postoperative patients supported nutritionally by intravenously administered casein hydrolysate. This study is being done in collaboration with Professor David V. Habif and Dr. Melvin S. Schwartz. With Dr. Gentaro Nishihara, he has begun testing the possible ability of growth hormone to reverse congenital development anomalies produced by the administration of cortisone to pregnant mice. Dr. Nishihara has also completed an experimental study of wound strength in relation to factors of incisional size, placement, and external support. Finally, Dr. Prudden has concluded his experimental evaluation of "cardiopneumonopexy" for myocardial revascularization.

In the animal operating room the major project this year has been an acceleration of the program to study the possibilities of intracardiac procedures using a pump-oxygenator to carry on the circulation during surgery. This program, begun the previous year by Dr. Shivaji Bhonslay under the direction of Professor Ralph A. Deterling, has included two research fellows, Dr. Irwin Simandl of Vienna and Dr. Felix Bacigalupo of Chile. In addition all of the surgeons with primary interest in the field have taken part in order to familiarize themselves with the technic as applied to clinical usefulness.

Special studies of blood clotting mechanism, electrolytes, and blood gases have been performed, the latter in conjunction with Professor Duncan A. Holaday of the Department of Anesthesiology. A series of over seventy-five of these dogs have been studied with regard to the various methods of cardiac arrest. Clinical trials began in the fall and have gone forward at an increasing rate with no deaths due to technical failure of the method. In the laboratory, the method is now standardized, and is being used to explore the possibilities of intracardiac valvular replacement. Evaluation of various types of valves in vitro by a pulse duplicator apparatus has been developed as well as the effect of coronary flow by varying the site of implanting the Hufnagel valve. Because of dangers and inherent defects, alternate methods of extra-corporeal circulation are being explored.

Long-term studies of vascular grafts preserved for periods up to seven years, and implanted in dogs for two years and of prosthetic replacements, have also been continued by Professor Deterling and Dr. Bhonslay, by Professor Ferdinand F. McAllister and Dr. Julius H. Jacobson, and by Professor Blakemore and Dr. Arthur B. Voorhees, Jr. Dr. Bhonslay has begun a joint study with Professor William M. Rogers of the Department of Anatomy on the application of phonocardiography in acquired and congenital heart disease. Patients have been studied before and after surgery for valvular disease or septal defects.

Professor Habif, Dr. Charles W. Findlay, Jr., and Miss Balbina Johnson in the surgical bacteriology laboratory have been concerned with studies

of wound infections in relation to antibiotic resistant organisms in the hospital population. In addition, studies of a variety of the newer antibiotics have been carried out with particular interest in their relationship to post-operative staphylococcal enterocolitis. A protracted study of the basic factors causing postoperative enterocolitides has been begun.

Professor Edmund N. Goodman with Mr. George Katz and Dr. Henry Colcher of the Department of Medicine has continued his fundamental work on electrical changes across the gastric mucosa as revealed by the electrogastrogram. In the clinical phase of this work a standard technique for the simultaneous recording of gastric potential from six areas has been developed. It is hoped that a clarification of the behavior of various factors both in health and disease will be applicable to the diagnosis of various diseases of the stomach, including carcinoma. Similar studies have been initiated for the esophagus and may help in the differential diagnosis of the causes of lower esophageal obstruction.

All of this research has been carried out primarily in the surgical laboratories. In addition, clinically oriented research from the Presbyterian and Delafield services has been vigorous. Studies of the spread of cancer in the head and neck have been continued by Dr. Carl Feind and in the intestine by Professor Robert S. Grinnell using clearing technique. Dr. Frederic P. Herter and Professor Thomas V. Santulli have explored the possible relationship of antibiotic therapy to intestinal tumor implantation at the time of surgery. Dr. Harold Harvey has continued his long-term follow-up studies of patients who have had gastric surgery and Professor Humphreys, with Professor Jose M. Ferrer, Jr., and Dr. Philip Wiedel, carried out a similar study on patients operated upon for hiatal hernia. Professor Robert N. E. Elliott, Jr., with Dr. Keith Reemtsma investigated the late results of splenectomy in mediterranean anemia and reported a thirty-five-year follow-up of patients treated surgically for all types of splenopathy. Professor Grant Sanger has initiated, at the Delafield Hospital, a review of their first five years of experience in the major categories of cancer. Because almost all patients not cured of their disease return to the Delafield for their terminal illness, an unusually good opportunity is presented for complete studies of the natural history of cancer in relation to therapy. Another painstakingly long-term study of cancer is that of cancer of the thyroid being conducted by Professors Virginia K. Frantz and Lawrence W. Sloan. The fact that in some cases this disease begins in youth and requires many decades to run its course makes these studies going back twenty or more years especially important.

A large number of meetings, local and national, have been attended by members of the staff, and a greater number of papers, talks, and symposium discussions have been delivered than in any previous year. Professor Hiatt presented papers in Teheran and Hong Kong during his return from Iran. Professor Lattes visited Colombia where he gave short courses in

tumor pathology at the universities of Bogotá, Cali, Medellín and Cartagena. Professor Deterling presented a paper at a meeting of the Latin-American Chapter of the International Society of Angiology in Havana. Over sixty papers were published from the department.

In addition to individual attendance at meetings, the department as a whole presented a program of short papers and laboratory demonstrations on October 25 to members of the sixth district, New York State Chapter of the College of Surgeons and a similar program for Surgical Alumni Day on April 26, 1957. The second Leon E. Sample lecture was given on May 2. Professor John Powers of the Mary Imogene Bassett Hospital spoke on the "Hazards of Rural Living" to combined meetings of the surgical, orthopedic, and anesthesiology staffs. Of particular interest was the second meeting of the Whipple Society, which met at the Massachusetts General Hospital in Boston on January 25. Professor Emeritus Allen O. Whipple was the guest of honor, and a large number of men trained by him attended. Professor E. D. Churchill presided and an interesting program was presented, centering on graduate training in surgery—the responsibility of the university, the responsibility of the hospital, and the responsibility of the profession.

Professor Deterling was elected recorder of the North American Chapter of the International Society of Angiology, honorary fellow of the Cuban National Surgical Society and chairman of the Vascular Suture Panel sponsored by the Ethicon Company to improve and standardize materials and methods of vascular suture. Professor Herbert C. Maier was appointed to the Board of Thoracic Surgery and was elected president of the New York Society for Cardiovascular Surgery. Professor Humphreys was elected president of the New York Surgical Society. Professor Blakemore, with Professor Barker and Dr. Voorhees, prepared an exhibit for the meeting of the American Medical Association in New York in June which won the Certificate of Merit Award.

DEPARTMENT OF UROLOGY

Professor JOHN K. LATTIMER, Executive Officer

The department is gratified to report that Dr. Hans H. Zinsser has become director of basic research and will help with the teaching programs. One of Professor Zinsser's large-scale research projects will have to do with the evolution and treatment of kidney stones. Professor Zinsser has had extensive experience in this field and is the author of many chapters in urological textbooks dealing with this subject. During the past academic year Professor Zinsser delivered papers before the National Gerontological Congress in Mexico City, the American Medical Association, the American Tuberculosis Association, and the American Society for Sterility.

In conjunction with the Presbyterian Hospital, plans have been crystallized for expanding the laboratory examinations and facilities in the clinical laboratory of the department for the more comprehensive and adequate analysis of calculi and for the examination of blood and urine to make it possible to study the formation and control of urinary calculi. The analysis of urinary calculi can now be done in much greater detail and crystallographic analysis of the stones and of their nuclei will be added to the chemical analysis. Quantitative analyses of the urine for cystine, xanthine, calcium, uric acid, and glucuronolactone, as well as two dimensional paper chromatography for relevant amino acids, will be added in the near future.

Undergraduate teaching of urology has been expanded and improved during this year with much more emphasis on ward rounds with demonstration of a patient and interpretation of his X rays by the student group. Didactic lectures have been continued, at the beginning of each session, followed by a second session of instruction with another instructor. Several sessions on x-ray diagnosis of the genitourinary tract have been introduced, conducted by the attending roentgenologist assigned to the Department of Urology by the Department of Radiology. Motion pictures of classical surgical procedures on the genitourinary tract have been introduced into the course along with live demonstrations of such procedures as perineal needle biopsy of the prostate gland. The teaching of simple techniques of catheterization, demonstrations of cystoscopy and other urological procedures are now provided on a regular schedule for all students.

Dr. Archie L. Dean, Jr., joined the staff of the Department of Urology in July, 1956, and has taken charge of the tumor clinic of the urological service. Dr. Dean will coordinate his research here with the work being done under Professor Perry B. Hudson in our cancer research laboratories and at the Francis Delafield Hospital. Dr. Dean has worked with Dr. Myron Roberts of the resident staff on a study and analysis of the results of total cystectomy for carcinoma of the bladder at the Columbia-Presbyterian Medical Center from 1928 to the present. Dr. Dean is also conducting an analysis of the patients with carcinoma of the prostate gland who have relapsed after orchiectomy and stilbestrol treatment. Dr. Dean has also been active in the field of pediatric urology with a review of the results of treatment of exstrophy of the urinary bladder.

Other new urologists who joined the staff were Drs. John E. Bowers, Murray B. Pincus, Paul F. Crutchlow, Michael J. Pirozzi, and Clement Furey, Jr. Dr. Bowers has prepared extensive reports on the treatment of interstitial cystitis and the incidence of neurological bladder after vaginal hysterectomy. Professor Emeritus George F. Cahill lectured on problems in the operative management of pheochromocytoma before the annual meeting of the American Urological Association and also prepared a paper on graduate and undergraduate teaching of urology which was delivered before the

American Urological Association meeting in Pittsburgh, Pennsylvania. At the commencement of Columbia University in June, 1956, Professor Cahill was awarded an honorary degree of Doctor of Medical Science in recognition of his long and distinguished career with the University and the Presbyterian Hospital. Professor George W. Fish was re-elected treasurer of the Medical Society of the County of New York and reappointed senior civilian consultant in urology to the United States Army. Professor Fish is also the official representative of the American Urological Association with the armed forces and is on the editorial board of the *Journal of Urology*. Dr. Stanley Braham completed his tour of duty as urologist for the United States Army in Germany and returned to his post as assistant in urology here. While in the service Dr. Braham published articles on hematuria in the medical bulletin of the United States Army in Europe.

The urological pathology section has continued to grow in international importance through the efforts of Professor Meyer M. Melicow. Professor Melicow reports that the number of specimens examined by the uropathology laboratory is increasing steadily. Due to Professor Melicow's reputation in the field, the number of outside specimens sent to him for a final opinion has been increasing with each passing year, and candidates who are about to take the examinations for the American Board of Urology are seeking him out for unofficial training.

Through the participation of Drs. Philip B. Jensen, Arthur Ullman, and Myron S. Roberts of the resident staff in the work of this department during the past year, the number of Kodachromes and slides of interesting specimens and radiographs has been substantially increased by means of a new special camera. With Dr. Aurelio Uson, Professor Melicow is in the midst of collecting, selecting, and reproducing important radiographs and photographs of gross specimens for their forthcoming textbook, *Urography Integrated with Uropathology*, which will include studies not only of the urological tract but also the adrenal gland and retroperitoneum. There will be a separate chapter on urography and uropathology in children. Professor Melicow is also preparing material for another textbook, *Neoplasms of the Urinary Tract and of the Adrenal Gland and Retroperitoneum in Adults and Children*. Professor Melicow has written two chapters on neoplasms of the adrenal cortex and medulla in children, which are to be published in a surgical series of books on neoplasms in children by Dr. George Pack of the Memorial Hospital. With Dr. Albert Damon of the Department of Medicine, Dr. Donald A. Holub of the resident staff, and Dr. Uson, Professor Melicow is engaged in the study of polycythemia associated with carcinoma of the kidney. An additional paper is being prepared on the collection of cases of cancer of the gonad in patients with genital anomalies of the pseudohermaphrodite type.

Dr. Ralph J. Veenema was elected secretary of the Urological Section of

the New Jersey State Medical Society. He has organized special outpatient clinics for patients with urinary calculi, urinary tumors, and other special conditions.

Dr. Reginald F. Seidel read a paper before the New Jersey State Medical Society's annual meeting.

Basic cancer research in the field of urology has been carried on under the direction of Professor Perry B. Hudson in the cancer research laboratories of the department and at the Francis Delafield Hospital. Professor Hudson and his group have continued researches in the fields of steroid biochemistry, enzymology, and nucleic acid chemistry. This group includes Professor T. Duane Price and Drs. Michael E. Lombardo and Rose M. Bower, who are working in the cancer laboratories of the college and at the Delafield Hospital. They have investigated the correlation between the values for urinary estrogens and the response to hormonal depletion operations in patients with mammary cancer. In addition, studies were made of the inter-conversion of steroids by incubated samples from adrenal glands of patients with mammary cancer. The ability of normal human testicular tissue to utilize progesterone as a precursor for human androgen biosynthesis was investigated.

Methods were developed for the critical quantitative evaluation of microgram quantities of nucleotides available in the acid soluble fractions, (RNA) and (DNA), of small samples of human tissues, and detailed studies of turnover rates in normal and malignant tissues were done. Other isotope-tracer experiments with small-molecule precursors of nucleic acid have included the study of reactions which constitute paths of entry and those which may be classified as side reactions.

Because of the accumulation of excessive amounts of uric acid in the blood of patients undergoing x-ray treatments and chemotherapy treatment for cancer constitutes a serious problem, methods have been investigated for the reduction of high blood levels of uric acid by administering the enzyme uricase. In a study of the acid phosphatases, an almost pure form of a phosphomonoesterase was isolated from yeast and its stability characteristics determined. The enzymes present in the human erythrocyte were also the subject of investigation and a method was developed for isolating an almost pure form of a purine nucleoside phosphorylase; its specific properties were described.

Professor Hudson has continued his accumulation of data concerning the biological behavior of prostatic cancer in 710 patients where biopsies of the prostate gland have been performed at the Delafield Hospital since 1951. The incidence of unsuspected prostatic cancer has been found to be approximately 12 percent, and will be compared with autopsy studies elsewhere. With an 80 percent follow-up record, this study will, as it continues, yield especially valuable information on the effectiveness of various treatments for cancer of the prostate.

Professor Hudson has been experimenting with a new method of urinary diversion in which a segment of the terminal ileum is employed as a "physiological valve" between the ureter and the sigmoid, with the idea of relieving back pressure upon the ureter by utilizing the unidirectional peristaltic action inherent in the portion of ileum.

Dr. Harry Seneca has continued his study of antibiotic susceptibility of various strains of resistant urinary infections as they have been encountered on our urological service. Antibiotic combinations are being studied to determine whether synergism will be of assistance. Chemicals and chemical complexes are under investigation as specific treatments against micrococcus, pseudomonas, proteus, and aerobacter infections. Mutation studies of these organisms are proceeding according to plan. Further studies on the protective role of metisteroids in toxemias of infection are being investigated. The role of hyaluronic acid in conjunction with metisteroids is presently under study. Studies are also being conducted with a chemical fraction of *Trypanosoma cruzi* which is being studied to determine whether an antigenic reaction with therapeutic possibilities can be developed along lines previously used in Europe. Dr. Seneca is also conducting studies in conjunction with Dr. Edward Henderson of the Schering Laboratories on the use of hyaluronic acid as a blood expander.

Dr. Eugene Speicher has completed his senior urological residency with a commendable record. Most notable is the great increase in the number of transurethral resections performed by Dr. Speicher.

During the academic year the Department of Urology enjoyed a thorough renovation of its physical facilities on the tenth floor of the Medical Center. Extensive planning was necessary in order to improve the teaching and practice of urology. The tenth floor cystoscopic facilities were modernized, and the urological x-ray department was provided with more adequate cubicle and waiting-room space. Autoclaves were installed to replace some of the older steam-sterilizing equipment. More bathrooms were added, sound-proof ceilings were installed throughout the corridors, and more adequate lighting provided in many areas.

During the year 1956-1957 it was found possible for the Department of Radiology to assign a full-time radiologist and radiology resident to the department for teaching research and complete clinical coverage in the field of urological radiology. Dr. Donald Johnson was assigned to this duty and has brought many technical improvements with him.

It was with considerable regret that all members of the urological staff saw Miss Cornelia B. McCoy, head of the Squier urological x-ray department, reach retirement age. On January 10, 1957, Miss McCoy was given a reception and party in the Squier clinic library. Many of her former technicians came from distant points to do her honor and many of her friends, both old and new, from all services of the hospital dropped in to wish her well. Miss McCoy has been with the department since its inception when

the Medical Center was built in 1929, and has a tremendous fund of knowledge of all of the workings of the department. After a brief vacation it is hoped that Miss McCoy will return to do part-time research work for the department.

During 1956-1957 the department noted with extreme regret the death of Mrs. J. Bentley Squier, wife of the founder of the Squier Urological Clinic. Mrs. Ursula Squier Reimer, Dr. Squier's daughter, presented to the department, the accumulated papers of Dr. J. Bentley Squier, including a biographical sketch written by his late wife and volumes concerning the beginning of the Squier Urological Clinic as well as Dr. Squier's work with the Columbia war hospital and the Tokio earthquake disaster, where he was active in organizing rescue efforts. These papers will be organized and kept in a repository in the Squier Clinic Library.

Professor John K. Lattimer continued his research work in the field of treatment of genitourinary tuberculosis. Ten-year follow-up information was reviewed on this tenth anniversary of the advent of streptomycin as the first effective antituberculosis drug. Six year follow-up data were reviewed in relation to the combination of streptomycin and PAS as more effective than streptomycin alone and three-year follow-up information was organized in relation to the use of isoniazid, in combination with streptomycin and PAS as the most effective treatment regimen for this disease. A new triple drug treatment regimen consisting of cycloserine (a new antituberculosis drug), plus isoniazid and sodium PAS has been tested extensively during the past year. Professor Lattimer has continued his work in the field of pediatric urology and presented a scientific exhibit demonstrating a scrotal pouch technique for orchiopexy. By this method the success of operations for the repair of undescended testis is more likely to succeed. This technique has been used and taught at the Squier Urological Clinic for the past ten years. Papers were presented at the annual meeting in April, 1957, of the American Association of Genitourinary Surgeons on congenital deficiency of the abdominal musculature with associated genitourinary anomalies. This rare but serious condition has been diagnosed in twenty-two cases at the Medical Center.

Professor Lattimer also presented a paper as a member of a panel on the conservative treatment of neurogenic bladders. In this regard the work of Professor James B. Campbell, of the Department of Neurological Surgery, was presented, in which he releases adhesions which bind down the spinal cord in children with meningocele, causing difficulties with the urinary tract. When these adhesions are released, urinary control improves. A paper on the triple voiding cystogram was delivered at the annual meeting of the American Urological Association. A paper entitled "The Standardized Columbia University Cystogram" was delivered by Dr. Archie L. Dean, Jr., in conjunction with Professor Lattimer, at the annual meeting of the Ameri-

can Urological Association at Pittsburgh, Pennsylvania. Professor Lattimer discussed the treatment of genitourinary tuberculosis at the fifteenth annual conference on the chemotherapy of tuberculosis sponsored by the United States Veterans Administration at St. Louis, Missouri, on February 6 through 9, 1956. Professor Lattimer represented the urological profession as a member of the Committee on Surgery in Tuberculosis for the United States Veterans Administration at that meeting. Professor Lattimer delivered a series of three lectures and discussed numerous other papers including a clinical pathological conference at the annual meeting of the Urological Association of Puerto Rico at San Juan, in March, 1957. Professor Lattimer also delivered addresses on chemotherapy of genitourinary tuberculosis before the American Academy of Tuberculosis Physicians in New York City and the American Association of Chest Physicians in conjunction with the meeting of the American Medical Association in New York City in June, 1957. Professor Lattimer was awarded a certificate honoring him for "signal scientific service to urology and tuberculosis" by the American Academy of Tuberculosis Physicians at the time of the American Medical Association meeting in New York. Dr. Lattimer also addressed the North Carolina Trudeau Society at its annual meeting in Asheville, North Carolina. During this year Professor Lattimer served as chairman on the Section on Genitourinary Surgery of the New York Academy of Medicine. He introduced a prize contest for residents in urological x-ray interpretations and brought speakers from many parts of the world to speak on the use of segments of intestines in genitourinary surgery, repair of hypospadias, and the treatment of prostatic cancer.

MEDICAL LIBRARY

Professor THOMAS P. FLEMING, Medical Librarian

This marks the twentieth year of Professor Fleming's association with the Medical Library.

Ten years from now the School of Medicine will be able to celebrate its bicentennial. The history of the Library is far briefer and actually dates back to the opening of the Medical Center in 1928 when various collections of literature in the departments of the College and a small students' library were joined with the books and journals of the School of Dental and Oral Surgery and the Janeway Library at the old Presbyterian Hospital (actually the Library of the Department of Medicine of P&S). This amalgamation with many duplicates, numbering about 50,000 volumes, was placed in a "college" library with all of what were then modern conveniences for college students. However, this library was intended to serve the first medical center in the modern sense and the physical facilities of a college library

were not suitable. The library was designed to house 100,000 volumes when filled to capacity. It took 160 years of Columbia's historical connection with medical education and 85 years of patient care by Presbyterian Hospital to amass 50,000 volumes (with many duplicates). It seemed reasonable to assume that this new library with a capacity of twice that amount would take care of the needs of the Columbia-Presbyterian Medical Center for the next fifty years.

Progress is sometimes so gradual that the individuals keeping pace with it do not realize the changes that are occurring. Ever since it was established, the Medical Center has been on the forefront of research and experimentation in all fields. It has attracted young, vigorous men and women dedicated to their profession and eager to advance medicine through education, practice, and research. But they were not alone. Others all over the world were likewise dedicated and all of them reported their findings in the present-day vehicles of communication. The result was a rash of new texts, monographs, technical reports, and journals with an increase in the size and number of volumes of already established journal titles.

In 1937 the Medical Library received 573 journals and with this number it was able to supply 90 percent of the requests for literature by those who had inquiring minds and creative possibilities. Today, the library receives *currently* 3,000 journals, but it cannot now supply more than two thirds of the literature cited by a research worker. This is not to say that the library is receiving journals of little significance. The wide range of research interests here, as revealed by the growth in grant money in the last ten years, has had its effect upon the growth of library resources, so that, although we have long since burst at the seams, we slip further and further behind in meeting current demands for literature.

The problem of space continues to be a tremendous one. The removal of 114th Street of all volumes of current journals prior to 1900 has been accomplished and because of the pressure of space many journals of secondary importance which ceased before 1940 have been likewise removed. This has meant the establishment of a daily procurement messenger to 114th Street and to South Property at 165th Street and Riverside Drive where we have now concentrated all texts and monographs in the basic sciences prior to 1920 and in the clinical sciences prior to 1930. The more than \$7,500 a year this is costing us to shift the collections and procure material might better be spent otherwise.

The survey of the status of working collections of literature in the various offices and laboratories of the Medical Center had to be deferred because of loss of personnel. The survey of the place of the library in the educational scheme of things conducted by a Subcommittee of the President's Committee on the Educational Future of the University was completed, but the results have not been released. A new telephone system was installed, raising

the individual numbers from five to seven and the number of actual phones with bridges to eleven. A public address system for paging clientele, while approved, has not yet been installed.

Because it has been costing the Medical Library an estimated \$4,000 a year to lend its publications to other medical installations, many commercial, in the metropolitan area, new regulations were inaugurated to place more clerical burden on the borrowing library rather than upon this library.

This coming year it is planned to enforce stringently the rules and regulations governing the borrowing of material as laid down by the Library Committee. In order to enforce the regulations, personnel of the Medical Library sent 17,219 postal cards and 447 personal letters requesting the return of material which had been kept beyond the normal term of loan. In any group of individuals there are always a certain number who ignore established regulations and this is the group that is responsible for the number of abortive notices which have been sent at a considerable cost of personnel time which might be better utilized elsewhere. It is proposed in the coming year to call to the attention of executive officers the names of flagrant violators of established regulations.

The library has continued to offer its fullest cooperation to the Medical Historical Society. It prepared exhibits and reading lists in conjunction with the various lectures that were given, and has continued its long-established series of formal and informal lectures on the use of the literature of various branches of the medical sciences.

The professional staff of the library continues to play an active part in international, national, and local affairs. This year the fifty-sixth convention of the Medical Library Association was held in New York City, and Erich Meyerhoff, the medical reference librarian, was in charge of program planning. Professor Fleming presented two papers, one before the dental school group on postwar dental documentation and the other, before a general meeting, on education for medical librarianship.

With the establishment of a number of new medical schools and the change from two- to four-year medical schools, the place of the library in the chain of command is again under discussion. The main question at issue seems to be whether the librarian of the medical school shall be under the supervision of the dean of the Medical School or under the supervision of the director of libraries of the University. The pattern of authority in this Medical Center library has been under considerable scrutiny by those who are establishing new schools of medical education. While there are admittedly some changes that could readily be made for improvement, this library stands out in the United States as one whose administrative set-up achieves desirable results. Because of this, the library receives innumerable questionnaires and its librarian is subject to many personal interviews and long-distance calls concerning the proper place of the library in any organization

coping with medical education, practice, and research. While our program of operation may not be ideal, it has a longer history than any other similar installation in the United States and its experience is of value to those institutions attempting now to emulate what has been done here for nearly thirty years.

WILLARD C. RAPPEYE, M.D.
Dean

June 30, 1957

Columbia University Bulletin

SERIES 58 • NUMBER 42 • OCTOBER 18, 1958



Faculty of Medicine

Report of the Dean, 1957-1958

Columbia University Bulletin • Series 58 • Number 42 • October 18, 1958

Issued at Columbia University, Morningside Heights, New York 27, N.Y., weekly from January for forty-four consecutive issues. Second-class mail privileges authorized at New York, N.Y., under the Act of August 24, 1912.

Printed for the University by Columbia University Press • 1,600 copies

Faculty of Medicine

Report of the Dean, 1957-1958

The registration of the School of Medicine was as follows:

First year	118
Second year	117
Third year	118
Fourth year	115
TOTAL	<u>468</u>

Residents from forty-six states, the District of Columbia, and twenty-five foreign countries, totaling 1,285 students from 230 colleges, applied for admission to the first-year class entering in September, 1958. The 120 accepted students received their liberal arts education in forty-five different colleges and came from nineteen states and one foreign country.

The registration of the School of Dental and Oral Surgery was as follows:

First year	40
Second year	39
Third year	32
Fourth year	42
TOTAL	<u>153</u>

During the year there were fifty-nine students registered for non-credit postgraduate courses in the Dental School and forty students registered for postgraduate credit courses. A class of twenty students was enrolled in the Courses for Dental Hygienists; eight received the Bachelor of Science degree.

In the School of Public Health and Administrative Medicine the registration was as follows:

D.P.H. candidates	1
M.P.H. candidates	32
M.S. candidates	43
TOTAL	<u>76</u>

The registration in the Department of Nursing was as follows:

First year	137
Second year	120
Third year	114
TOTAL	<u>371</u>

During the past year there were 361 students from sixteen affiliated schools of nursing who received instruction under the Department of Nursing in various hospital and laboratory units of the Medical Center.

In the Course for Occupational Therapists twenty-nine students were registered, and in the Course for Physical Therapists, forty-five students.

The following degrees were awarded during the year:

M.D.	115
Med.Sc.D.	2
D.D.S.	42
D.P.H.	2
M.P.H.	32
M.S. (Nursing and Public Health fields)	51
B.S. (Nursing, Occupational Therapy, Physical Therapy, Dental Hygiene)	134

In addition to the students enrolled under the Faculty of Medicine, there were approximately ninety students registered under the Graduate Faculties of the University who took courses and advanced research work in the departments of the Medical School.

The preceding figures indicate that the Faculty of Medicine is responsible for the instruction of many more students, graduate and undergraduate, than is commonly known. The total of medical, graduate, postgraduate, nursing, occupational therapy, physical therapy, dental, dental hygiene, and public health students, visiting scholars, fellows, hospital residents, and younger staff members runs to over three thousand full-time and part-time students.

It is gratifying to report that during the academic year 212 medical students received scholarships averaging \$400 to \$500. Of these, fifty-two were summer research scholarships.

It is with the greatest sorrow that we report the following deaths during the year:

Robert C. Drelich, Instructor in Anatomy, on March 5, 1958

Earl T. Engle, Professor of Anatomy (assigned to Obstetrics and Gynecology), on December 17, 1957

Henry James, Consultant, First Medical Division, Bellevue Hospital, on July 14, 1957

Daniel Laszlo, Lecturer in Medicine (Montefiore) on June 1, 1958

Lawson G. Lowrey, Lecturer in Psychiatry, on August 16, 1957

Edmonde D. Neer, Consultant in Otolaryngology, in the fall of 1957

Henry S. Patterson, Consultant, Presbyterian Hospital, on December 10, 1957

C. Wadsworth Schwartz, Consultant, Radiology, Presbyterian Hospital, on October 30, 1957

Thomas W. Stevenson, Jr., Professor of Clinical Surgery, on February 22, 1958

Lewis R. Stowe, Professor of Dentistry, on November 4, 1957

The following retirements, effective June 30, 1958, are reported:

Dana W. Atchley, Professor of Clinical Medicine

George V. Browne, Associate Professor of Clinical Otolaryngology

The following emeritus designation was made by the Trustees:

Dana W. Atchley, Professor Emeritus of Clinical Medicine, effective July 1, 1958

The following promotions were made, effective July 1, 1958:

Hattie E. Alexander, Professor of Pediatrics

Dorothy H. Andersen, Professor of Pathology

Sam M. Beiser, Associate Professor of Microbiology

Stanley E. Bradley, Professor of Medicine

Mary I. Crawford, Associate Professor of Nursing

Quentin B. Deming, Associate Professor of Medicine

Nicholas A. DiSalvo, Professor of Dental and Oral Surgery

Alfred P. Fishman, Associate Professor of Medicine

Alfred Gellhorn, Professor of Medicine (Delafield Hospital)

Gabriel C. Godman, Associate Professor of Microbiology

Harold D. Harvey, Professor of Clinical Surgery

Duncan A. Holaday, Associate Professor of Anesthesiology

Calderon Howe, Associate Professor of Microbiology

Yale Kneeland, Professor of Medicine

Nathan Lane, Associate Professor of Surgery

Lester C. Mark, Associate Professor of Anesthesiology

Councilman Morgan, Associate Professor of Microbiology

George A. Perera, Professor of Medicine

Helen F. Pettit, Professor of Nursing

Dominick P. Purpura, Associate Professor of Neurological Surgery
 Charles A. Ragan, Professor of Clinical Medicine
 Dorothy E. Reilly, Associate Professor of Nursing
 Charles T. Ryder, Associate Professor of Clinical Orthopedic Surgery
 Rudolph N. Schullinger, Professor of Clinical Surgery
 William Silverman, Associate Professor of Clinical Pediatrics
 David B. Sprinson, Professor of Biochemistry
 John V. Taggart, Professor of Medicine
 Joseph C. Turner, Professor of Clinical Medicine
 Arthur R. Wertheim, Associate Professor of Medicine

The following new appointments were made:

William H. Sebrell, Jr., Professor of Public Health Nutrition, from October 1, 1957
 Elmer L. Severinghaus, Professor of Public Health Nutrition, from July 1, 1958
 William N. Thetford, Associate Professor of Medical Psychology, from February 1, 1958

The following designations were made:

Eleanor Lee, Associate Dean (Nursing), effective July 1, 1958
 Edward V. Zegarelli, Edward S. Robinson Professor of Dentistry, effective March 1, 1958

The Janeway Prize, awarded to the graduate who, in the opinion of the faculty, has ranked highest in efficiency and ability, was given to Samuel H. Barondes. The Borden Undergraduate Research Award was given to Robert H. DeBellis, for outstanding research work during the medical course. The Joseph Mather Smith Prize, awarded to the graduate whose essay or original research in medical subjects is deemed by the Committee on Award to be the most meritorious, was given to Dr. Emanuel A. Friedman, Class of 1951. The Coakley Memorial Prize was awarded to Raymond B. Strauss. The Frederick P. Gay Memorial Award was given to Ora Mendelsohn Rosen. The William Perry Watson Prize in Pediatrics was given to Herbert L. Cooper. The Van Woert Scholarship Prize and the Alpha Omega Fraternity Award were given to Ronald Dubner. The Ella Marie Ewell Certificate was awarded to Frank P. Iuorno. The Operative Division Prize and the Rowe-Wiberg Medal were given to Jack Rosen. Walter A. Butstein received the Class of 1929 Award in Pedodontics and the Psi Omega Fraternity Award. Eugene M. Jacoby received the William Bailey Dunning Award for Excellence in Periodontology.

A brief resumé of some of the recent activities of the Faculty of Medicine has been prepared as a special report under the title "The Current Era of the Faculty of Medicine." It recites some of the plans and decisions which were made in response to the rapidly shifting socio-economic conditions in this country and the phenomenal growth of scientific knowledge. It dealt with discussions of those features which bear importantly on the educational and financial activities of the Medical School, the Medical Center, and the affiliated hospital programs. The summary is primarily designed for the information of the present staff and to provide a short history of the University's contemporary program of education, research and hospital services.

THE GRADUATE AND POSTGRADUATE PROGRAM

The graduate training program in the hospitals affiliated with the school, consisting of visiting fellowships, internships, and residencies has shown an increase. One hundred and ten fellows registered for part or all of the last academic year; twenty-two of them came from foreign countries. In addition, numerous foreign visitors have been here for shorter periods of time. In the affiliated hospitals 576 interns and residents have received at least a large part of their instruction from members of our staff. The education of these physicians is, in general, closely correlated with their acquisition of clinical experience on an individual basis.

There has been a modest decrease in the postgraduate program for practicing physicians. Four hundred thirty-eight doctors enrolled for forty-one courses, designed to acquaint them with recent advances in the various fields of medicine.

Perhaps related to this decrease is a gradual shift in emphasis in postgraduate medical education. A few years ago there was considerable demand for the "refresher" type of course, providing superficial coverage over a broad area; now there is more interest in fairly intensive courses covering limited fields. This is perhaps a result of dissemination of the idea that broad coverage of clinical subjects can be more satisfactorily accomplished by a residency type of training than by formal postgraduate courses.

The most numerous demands for broad coverage of clinical subjects come from graduates of foreign medical schools who are anxious to learn about American medicine. It is unfortunate that our heavy commitment in the field of graduate education, mentioned above, prevents us from being able to do more to meet these requests.

STUDENT HEALTH SERVICE

The Student Health Service, under the faithful direction of Dr. Albert R. Lamb, Jr., continues to meet the health needs of the students and employees of the Faculty of Medicine.

During the past year there were 376 routine physical examinations on students. Routine chest x-rays and routine dental examinations, including x-rays, are available to the student body. Besides providing routine health services, the Student Health Service continues to help students in other ways, such as rendering premarital examinations, completing insurance forms, and offering other similar services.

The Personnel Health Service, with Dr. Arthur I. Snyder as physician-in-charge, has performed 224 pre-employment physical examinations. In addition there have been 545 routine physical examinations, office visits, and the like.

Anatomy

ACTING EXECUTIVE OFFICER: Professor Wilfred M. Copenhaver

The department suffered a severe loss through the death of Professor Samuel R. Detwiler on May 2, 1957. During the thirty years in which he served as executive officer, the department gained a position of eminence under his stimulating and intelligent guidance. He was an inspiring teacher and an investigator of international reputation in the field of neuroembryology. A memorial volume of research contributions by his colleagues will be published in the *Anatomical Record*.

It is with profound regret that we also record the death of Professor Earl T. Engle on December 17, 1957. He joined the department in 1928, and was promoted to a full professorship in 1939, with assignment to obstetrics and gynecology in 1949. He played a collaborating role between the preclinical and clinical sciences, and, his research in endocrinology and in human reproduction earned him an international reputation early in his career.

The teaching activities of the department continue at their previous high level. In addition to giving the regular medical and dental courses in anatomy, embryology, histology, and neuroanatomy, members of the department have participated in postgraduate courses in orthopedic surgery, ophthalmology, otolaryngology, and neurology which serviced seventy-five residents of affiliated hospitals over the past year. They have also given courses in the Department of Nursing, the School of General Studies, and in the Summer Session. A special effort has been made to improve and expand our program for students of the Graduate Faculties.

Our research potential has been increased by the fact that the work of each full-time staff member is supported, in part, by one or more research grants.

An active research program is now in progress in our laboratory of electron microscopy which is under the direction of Professor George D. Pappas. The laboratory was established last year for research on the eye and on cardiovascular tissue. In collaboration with Professor George K. Smelser, Professor Pappas has obtained electron micrographs which show for the first time the manner of the attachment of the zonula fibers to the ciliary epithelium.

Professor Smelser has conducted research on the embryology of the eye,

exophthalmos, behavior of S^{35} labeled sulphated mucopolysaccharides of the cornea in relation to wound healing, and electron microscopy.

Professor Melvin L. Moss has continued his studies of an osteogenic inductor factor which can be extracted from bone and muscle tissues. He has completed a number of papers on normal and abnormal sutural growth. In studies of human cranial malformations, he has given special attention to cleft palate.

Professor Charles R. Noback, in collaboration with Professor James B. Campbell, Dr. Jakob Husby of the Department of Neurological Surgery, and Dr. Andrew L. Bassett of the Department of Orthopedic Surgery, has studied the anatomical regeneration of nerve fibers across gaps of transected spinal cords in cats. Professor Noback has also continued his studies on the cytoarchitecture of brain stem nuclei.

Professor Herbert O. Elftman has investigated the histochemical changes produced in the pituitary when the control exercised over it by the hypothalamus is interfered with surgically or by pharmacological agents. He has also completed studies on the phospholipids of the anterior pituitary, methods of fixation for lipid histochemistry, and the structure of the Golgi apparatus. Professor Elftman has continued to serve on the Committee on Prosthetic Research and Development sponsored by the National Research Council.

Professor Malcolm B. Carpenter has continued his research on the functional relations between the fastigial nuclei and the labyrinth in the cat. Another research project completed during the year deals with the choreoid hyperkinesia provoked by discrete lesions of the corpus Luysii in the monkey and indicates that this is not transmitted to segmental levels of the spinal cord by the rubrospinal tract. Studies on the effects of secondary lesions in the globus pallidus of the rhesus monkey have shed light on the function of this tissue in non-pyramidal motor integration and in mediating certain types of cerebellar dyskinesia.

Professor Margaret R. Murray's laboratory for cell physiology has had a number of visiting investigators, thus serving as a postdoctoral training center in methods and principles of tissue culture. The basic research in the laboratory has centered on the living cell in three main directions. Professor Murray and Dr. Edith Peterson have confirmed the hypothesis that the Schwann cell rotates around the axis cylinder during myelin formation. In collaboration with Professor Erwin Chargaff, Mrs. Helena Benitez has obtained results which support the hypothesis that the pentose nucleic acids in the cytoplasm are involved in cytodifferentiation. In collaboration with Professor Dan Moore, Dr. Etienne Lasfargues has made progress in characterizing the milk agent for mouse mammary carcinoma.

Professors Dorothy D. Johnson and Harry H. Shapiro have continued their studies on the transplantation of tooth buds in the cat. Professor John-

son is also collaborating with Professor Wilfred M. Copenhaver on an extensive revision of Bailey's *Textbook of Histology* for the fourteenth edition. Professor Shapiro is editing the second edition of *The Surgical Treatment of Facial Injuries* by Drs. Varaztad H. Kazanjian and John M. Converse. Professor Shapiro has been appointed associate director of the Institute of Reconstructive Plastic Surgery at the New York University-Bellevue Medical Center.

Professor Edmund Applebaum is collaborating with Dr. Austin Kutscher on the effect of ingestion of Triamcinolone on the oral mucous membranes and teeth. He is also collaborating with Professor Melvin L. Moss and Dr. Henry Levy in a study of the spreading of the maxillary suture in the rabbit.

Professor Emanuel B. Kaplan is studying the morphology of the human foot in comparison with that of other primates and mammals. He is completing a textbook on orthopedic approaches to the neck, back and extremities.

Professor William M. Rogers and Dr. Erwin Simandl, a visiting investigator from Vienna, have collaborated with Professor Ralph A. Deterling, Jr., and Dr. Shivaji B. Bhonslay of the Department of Surgery on an experimental study of heart sounds and murmurs produced by the pulmonary valve. Professor Rogers is also collaborating with Dr. Barraud J. Watson of the Department of Orthopedic Surgery on an experimental and clinical investigation of quadriceps atrophy. In collaboration with Dr. Solomon L. Katz of the Department of Dental and Oral Surgery and Dr. James S. Harrison, Professor Rogers is continuing his studies on the temporomandibular joint.

Professor Charles A. Ely has studied the formation of ovarian tumors which are induced when ovaries are implanted in the spleens of castrated mice. He is continuing studies on the effects of antihormones in a number of other experiments.

Professor Frederic J. Agate, Jr., is continuing his investigation of the role of the hypophysis in defense against low environmental temperatures in laboratory animals. In collaboration with Professor William A. Silverman of the Department of Pediatrics, he is developing methods for the precise control of body temperature in the premature infant. In collaboration with Professor Seymour Lieberman of the Department of Biochemistry and Professors Bernard F. Erlanger and Sam M. Beiser of the Department of Microbiology, he is continuing an investigation of the physiological properties of protein conjugated steroids.

Professor Wilfred M. Copenhaver has conducted research on the cyto-differentiation of cardiac muscle as studied by histochemical methods and by electron microscopy in collaboration with Professor George D. Pappas; on the specialized conduction system of the mammalian heart; and the rate of turnover of S^{35} by the heart valves.

Anesthesiology

EXECUTIVE OFFICER: Professor Emanuel M. Papper

The Department of Anesthesiology was fortunate in the strengthening of its staff during this past year. The return of Professor Shih-Hsun Ngai on July 1, 1957, after two years of military service was of great value to the department. During his assignment to the Army, Professor Ngai carried on outstanding work in the Walter Reed Army Institute of Research and received a special citation in recognition of his service. The return of Dr. Robert M. Epstein to the department after a year with Professor Stanley E. Bradley of the Department of Medicine as a fellow of the New York Heart Association was also most welcome. Dr. Epstein's experience with Professor Bradley was fruitful for him and for the department. The work relationships established during Dr. Epstein's fellowship with the Department of Medicine have continued on a part-time basis since his return. New to the department is Dr. Charles C. Wycoff, a former member of the faculty of the University of California. Dr. Raymond Jonnard has been added to the Anesthesiology Service in the Presbyterian Hospital as a consulting engineer. His work and advice have been most valuable to Professor Duncan A. Holaday in some of the latter's research. Dr. Norman A. Bergman resigned to accept a position at the University of Utah.

The report of the Subcommittee on Curriculum provided much interesting material pertaining to the instruction in anesthesiology given to the students in the College of Physicians and Surgeons. While it is recognized that a study of anesthesiology should not be a major discipline for undergraduate students, it is necessary that they have some background and useful information about airway management, artificial ventilation, and the support of a failing circulation, to mention but a few subjects that this department is qualified to teach. It is also obvious that the wish of members of this department (which consists entirely of full-time people) to teach students could be implemented more effectively. The study of the curriculum recommended that these subjects be dealt with in a clinical clerkship and a modest number of didactic exercises for all students.

Graduate education consists, as in previous years, in the conduct of a strong residency program. In addition to the residency, provision has been made for the training of research fellows to a modest degree. The National Institutes of Health have awarded this department two trainee grants in

accordance with its policy of fostering the development and training of anesthesiologists suited for academic careers.

The departmental staff has maintained its large and active participation in a variety of professional and scientific organizations throughout the country. Its members hold offices and positions of responsibility in many societies whose interests are appropriate to anesthesiology. These include the position of chairman of a section of the Instrument Society of America, and offices in county, state, and national societies. Members of the department have published or have in press thirty-seven papers and have presented scientific addresses on ninety occasions. As in previous years, the department was fortunate in having distinguished visitors who were sources of stimulation and education to the entire department. Some of the visitors were Professors Geoffrey Dawes, Edgar A. Pask, Akira Inamoto, James O. Elam, Eleanor Zaimis, Robert Hingson, Robert D. Dripps, and Drs. Ronald Jarman and Curtiss B. Hickcox.

Honors were bestowed on several members of the department. Professor Duncan A. Holaday served as conference chairman of the Tenth Annual Conference on Electrical Techniques in Medicine and Biology. Professor Virginia Apgar addressed various meetings on thirty-three different occasions outside the College. Professor M. Jack Frumin was invited to lecture to the students of the University of Puerto Rico on some of his investigations. Professor Emanuel M. Papper served as program chairman for the American Society of Anesthesiologists and lectured at the University of London and the Faculty of Anaesthetists of the Royal College of Surgeons. He was also the Hartmann lecturer in anesthesiology at the University of Basle for 1957. Professor Papper addressed the Puerto Rican Chapter of the American College of Surgeons and, together with the other guest speakers, received the key to the City of San Juan from the mayor of that city.

Professor Virginia Apgar and Dr. Frances F. Schachter completed a follow-up study of 165 children between the ages of seven and nine years. These were part of an original group of 404 infants who were studied at birth with oxygen determinations of blood from the heel. There was opportunity also to compare different types of psychological methods of testing children at the pre-school and early school ages. Such studies are being prepared for publication by Professor Apgar and Dr. Schachter.

Professor Apgar and her collaborators, Drs. L. Stanley James and Irwin M. Weisbrot, also continued their studies in the physiology of the newborn and of the mechanisms of asphyxia. Their studies were aided by the able collaboration of Professor Duncan A. Holaday and Dr. Edward Prince of the Department of Obstetrics and Gynecology.

Professor Holaday continued his studies of respiratory mechanics. In collaboration with Dr. Paul Gerst of the Department of Surgery and Dr. Christen Rattenborg, Professor Holaday studied the effects of acute hemor-

rhage on pulmonary and systemic blood pressure, and on the efficiency of the mechanisms involved in the transport of respiratory gases. Professor Holaday also conducted an evaluation of several instruments designed to monitor various circulatory and respiratory functions during clinical anesthesia. He has continued his studies of artificial respiration, his major interest for the past eight years.

With Dr. Hubert Rosomoff of the Department of Neurological Surgery, Professor Holaday has participated in studies of hypothermia. The technique of establishment of hypothermia has been simplified and standardized to the point where there is no important increase in induction time for anesthesia and where operations upon vascular anomalies of the brain can be carried on efficiently without increased morbidity or mortality. Cardiac arrhythmias have been minimized and brain trauma and blood loss reduced. Much of the effective application of hypothermia has been the result of excellent teamwork between the two departments. At the present time, studies are directed toward elucidating the circulatory responses to hypothermia. Studies of central venous pressure and cerebral spinal fluid pressure were carried out simultaneously with measurements of arterial pressure.

In collaboration with Professor Ralph A. Deterling, Jr., and Dr. Shivaji B. Bhonslay of the Department of Surgery, Professor Holaday has continued his studies of the biochemical changes in patients subjected to extracorporeal circulation for open-heart surgery. In collaboration with Dr. Raymond Jonnard, Professor Holaday is studying the use of fluorescent material for the dye dilution method of measuring cardiac output during general anesthesia. He is also engaged in the development of a micro-electrode pH meter. In collaboration with Dr. Gustav J. Beck, he has engaged in preliminary studies of the absorption of drugs administered by nebulization into the respiratory tract. Several drugs were studied, including succinylcholine, meperidine, and some barbiturates.

Professor Holaday and Dr. Frank Van Luik of the General Electric Laboratories conducted some preliminary studies applying the principle that airborne particles less than $1/10$ of a micron in size were absorbed to the extent of 90 per cent by inhalation, whereas particles greater than $1/10$ of a micron in size were exhaled in approximately the same concentration as they were found in the air. Dr. Van Luik has a particle-counting instrument which is capable of discriminating between these two classes of particles.

Professor Herbert Rackow and Dr. Ernest Salanitre have been engaged in a study of pre-anesthetic medication in children. The studies are conducted by random selection based upon the unit numbers of the charts. Thus far 430 patients have been studied. It is estimated that nearly 2,000 will be required for a proper statistical series to be evaluated. This represents an attempt to measure objectively a subjective response, i.e., sedation, amnesia, and the other factors which are commonly needed for the preparation of

children for anesthesia and operation. Professor Rackow and Dr. Salanitro concluded their studies of intramuscular succinylcholine in children.

In collaboration with Professor Edgar C. Hanks, Professor Rackow and Dr. Salanitro standardized the various pieces of anesthetic equipment for use in children. This had never been done before. The pieces of equipment are now interchangeable.

Professor Rackow and Dr. Salanitro studied further the problem of metabolic acidosis, with the advice and assistance of Professor Holaday. Professor Rackow and Dr. Salanitro are reviewing their experiences with anesthesia for cleft-lip and cleft-palate repairs. These clinical problems have provided much source of difficulty in the management of anesthesia in the past and methods of solving the difficult airway problems appear to be encouraging.

Professor M. Jack Frumin, in collaboration with Professor Rackow and Drs. Salanitro, Vance Lauderdale, Jr., and Norman A. Bergman, studied the change in the lung volume in the closed chest in man during mechanical artificial respiration. These studies were conducted in an effort to account for the changes in arterial oxygen saturation when various expiratory resistances were applied while the end tidal $p\text{CO}_2$ was kept constant with the Servo respirator developed by Professor Frumin and Mr. Arnold S. Lee.

Professor Frumin studied apneic diffusion oxygenation in anesthetized man utilizing a technique whereby arterial oxygenation is maintained during periods of total apnea up to one hour in duration. Arterial pH, $p\text{CO}_2$ and electrolyte changes were followed as carbon dioxide retention took place.

Considerable progress has been made in the construction of new types of anesthesia apparatus to deliver fixed known concentrations of the volatile anesthetic agents for either surgical anesthesia or the light levels characterized by analgesia and amnesia. These instruments are based upon the principle of delivering a definite volume of liquid agent into a definite volume of the carrier gas. In connection with this apparatus, new nonrebreathing valves and an artificial respirator were also developed. These developments in instrumentation are designed to study quantitatively the effects of any given level of anesthesia with controlled tensions of the gases on the circulation and other body functions.

Dr. Robert M. Epstein continued his studies in Professor Bradley's laboratory comparing direct measurements of renal blood flow with the tracer dilution method for renal water volume. Dr. Epstein also engaged in studies to observe the pattern of the removal of bromsulfalein during general anesthesia in man. Dr. Epstein has begun studies with a new analgesic-anesthetic agent 1-(1-phenylcyclohexyl) piperidine. The clinical usefulness of this drug remains to be seen.

Professor Edgar C. Hanks has continued his work in the studies of extracorporeal circulation for open-heart surgery in collaboration with the other members of the group in the Departments of Surgery and Anes-

thesiology. In collaboration with Dr. Vance Lauderdale, Jr., Professor Hanks has conducted a preliminary evaluation of the new muscle relaxant, Imbretil.

In collaboration with Professor Shih-Hsun Ngai, Professor B. Raymond Fink has studied the electromyogram of the diaphragm of decerebrate cats. The response of respiratory muscles to inspiratory resistance was determined quantitatively before and after administration of anesthetic agents.

In collaboration with Professor John Conley of the Department of Otolaryngology, Professor Fink is continuing his studies of the swallowing function in patients subjected to radical surgery of the head and neck. He has also studied the principles involved in the vaporization of anesthetic liquids and applied these to the construction of an ether vaporizer which performs favorably with that of the best vaporizers in current use. In collaboration with Professor Robert M. Hui of the Department of Otolaryngology, Professor Fink has continued his roentgenographic studies of disorders of laryngeal function. The aerodynamics and flow mechanics of the larynx during respiration and phonation have been further analyzed in collaboration with Dr. F. Kirschner of the General Electric Corporation.

Professor Ngai has continued his studies on the physiology and pharmacology of the respiratory center in collaboration with Professor S. C. Wang of the Department of Pharmacology. On decerebrate cats a number of respiratory depressants and stimulants were studied, including pentobarbital, meperidine, coramine, micoren, megimide, and levallorphan. Professor Ngai conducted preliminary trials with chloroform analgesia for minor surgical procedures. A Tecota inhaler was calibrated in England for use with chloroform and fluothane.

In collaboration with Professor Roberts Rugh of the Department of Radiology, Professor Ngai studied the tolerance to anesthesia of x-irradiated rats. He also studied the characteristics of the "copper kettle" for ether vaporization. Ether vapor concentration in the effluent mixture from the "copper kettle" was measured and correlated with the temperature of the liquid ether.

Professor Lester C. Mark and Dr. Leonard Brand with Drs. Bernard B. Brodie, John J. Burns, and Peter Dayton of the National Heart Institute continued their studies on intravenous anesthetics. Studies of methitural (neraval), methyl-thioethyl, 5 (1 methyl-butyl) 2 thiobarbiturate have been completed. A study is now in progress with a new Lilly compound, 1 methyl 5 allyl, 5 (1 methyl 2 pentynyl) oxy-barbiturate. Professor Mark and Dr. Brand plan to study its physiological disposition in the dog and man.

These studies over the years have pointed out the limitation of intravenous anesthetics belonging to the barbiturate family. For this reason a study with a new type of short-acting intravenous anesthetic unrelated to the barbiturates has been undertaken. Designated as G 29505, the compound is the diethylamide of 2 methoxy 4 allyl phenoxyacetic acid. Investigation of its clinical efficacy is under way. Later on, chemical studies will be undertaken of its distribution in the body and metabolism in order to shed light on its

action and perhaps to suggest changes in structure to make a better anesthetic.

N-allyl substitution of analgesic drugs has produced some useful narcotic antagonism. It was hoped that the same principle applied to the barbiturate field. Two Lilly compounds, 1, 5 diallyl 5 (1 methylpropyl) thiobarbiturate and its oxygen analogue were obtained for testing in the dog.

Studies on the blood-brain and blood-spinal fluid barriers have been resumed in dogs with barbital as the indicator drug, since it distributes uniformly in total body water. These experiments should enable us to tell whether barbital reaches the cisterna magna by direct diffusion from the bloodstream or indirectly via diffusion into the brain and thence as part of its extracellular fluid to the cisterna.

In addition to his studies with Professor Mark, Dr. Brand collaborated with Drs. Seamus Lynch and Albert Levy in studies on pulmonary compliance with changes of position during certain types of surgery. Particular reference was made to the effect of the prone position on respiratory mechanics in patients subjected to operations on the spine.

Professor Herman Schwartz conducted a clinical study on the new anesthetic agent, Fluothane. Reports by British workers and other Americans were corroborated in essential features.

Dr. Vance Lauderdale, Jr., has continued his activities in improving the record system of the department's clinical activities. This work has resulted in a new anesthesia form which provides a clearer picture of the peri-anesthetic period. Dr. Lauderdale has kept the department's records of anesthetic complications and deaths up to date in collaboration with Professor Edgar C. Hanks. Dr. Lauderdale has provided assistance to both Professor Frumin and Professor Holaday in their work on the mechanics of respiration.

Dr. Seamus Lynch in collaboration with Dr. Albert Levy and Dr. Kent Ellis of the Department of Radiology has conducted studies on the effects of applied negative airway pressures upon the mechanics of respiration. Together with Professor Holaday, Dr. Lynch and his colleagues have applied the four-phase research model respirator to this problem. Further studies with the open chest and the open abdomen are planned. Extension of these studies to patients with severe respiratory disease, including disabling emphysema, asthma, and pulmonary fibrosis, are also planned. Dr. Albert Levy has also continued his collaboration with Professor Edgar C. Hanks in the extracorporeal circulation program.

Dr. Charles C. Wycoff has engaged in a study of the effects of acetyl strophanthidin on the heart of the normal young dog. In Professor René Wégria's laboratory, Dr. Wycoff conducted some studies on the effects of succinylcholine on the coronary circulation. Dr. Wycoff also developed for clinical use a simplified method of measuring the central venous pressure during operative surgery. The method was shown to be valuable as an aid to the diagnosis of acute heart failure during clinical anesthesia and operation. Dr. Wycoff showed a series of motion picture films which he had made

on the subject of caudal and peridural anesthesia, brachial plexus block, transtracheal and superior laryngeal block, pudendal block, general anesthesia and dentistry, cervical peridural anesthesia, and intercostal nerve block.

Dr. Rita Jacobs completed a survey of anesthetic management of infants with tracheoesophageal fistulae operated upon at the Babies Hospital between 1950 and 1956.

Biochemistry

EXECUTIVE OFFICER: Professor David Rittenberg

Instruction in biochemistry has been given to the first-year medical and dental classes and to thirty-six students under the Graduate Faculties. Of the latter, seventeen have been carrying on advanced studies towards the Ph.D. degree in biochemistry and nineteen have received instruction at an elementary level. Of these last, seven had their major interest in biochemistry and twelve in other departments of this college.

Almost all those who hold academic appointments in the department have taken part in the instruction of medical and dental students. This has not resulted in a diminution of their research activities. Some modifications in the biochemistry course for the medical students have been made and a course in enzyme chemistry for graduate students has been initiated.

Professor David Rittenberg has carried on investigations on the rate of protein synthesis in bacteria. Professor Erwin Chargaff and his group have continued their studies on the chemistry and physiology of nucleic acids, nucleoproteins and the high-molecular mucolipids of the brain.

Professor Zacharias Dische continued his work on the conversion of glucose-6-phosphate to ribose-5-phosphate, with particular emphasis on the role of various transketolase acceptors in this reaction. He continued also investigations on mucoids and neutral mucopolysaccharides in the animal body. In conjunction with Professor Paul A. di Sant'Agnese from the Department of Pediatrics, the composition of the mucoids in the duodenal fluids of normal children and children with cystic fibrosis of the pancreas were investigated. In conjunction with Professors Hans H. Zinsser from the Department of Urology, an investigation was started on the mucoids in normal and pathological urine. The work on the mucoids of serum globulins was also continued. The work on the mucoids of serum globulins as well as on neutral heteropolysaccharides in bone, kidney, and brain were also continued.

The Biochemistry Division assigned to the Francis Delafield Hospital has made progress in its program of cancer research under the direction of Professor Samuel Graff. Professors Max A. Eisenberg and Horace B. Gillespie, Drs. Kathe B. Liedke, Victor Ross, Kenneth S. McCarty, and Aaron D. Freedman, Mr. Alvin Ostashever, and Mrs. Ada M. Graff have made progress in developing cell culture, in isolation of an anti-leukemia factor. They are continuing their studies of the energy pathways in cancer cells.

Professor Maxwell Karshan continued his studies on the amylase activity and chloride content of saliva in relation to dental caries.

Dr. Alvin Krasna has continued his studies on the stereospecificity of the aspartase reaction and on the purification and properties of the enzyme hydrogenase.

Professor Barbara W. Low and her associates continued the x-ray crystal structure studies of insulin, in an effort to determine the molecular stereochemistry. Working with Professor Low on one or more of the varied aspects of this problem were Drs. Jan Drenth, Fred L. Hirschfeld, Alexander S. McGavin, and Wolfe Traub.

Dr. Stanley L. Miller has been studying the kinetics of H_2 and D_2O catalyzed by the enzyme hydrogenase. Several inorganic and organic compounds, which will catalyze the exchange reaction, have been studied as models for the enzyme. He has continued his studies on the origin of amino acids in the primitive world. Experiments are being conducted to find conditions under which purines and pyrimidines might have been synthesized on the primitive earth.

Professor David Shemin and his colleagues have continued their studies on the metabolism and porphyrins, vitamin B_{12} , and related compounds. Under his editorship the fifth volume of *Biochemical Preparations* was published. Several postdoctoral fellows collaborated with him during this year: Dr. Goro Kikuchi of the Nippon Medical School, Tokyo, Japan; Dr. Abhaya Kumar, Rockefeller Fellow from India; Dr. Frances Baker, United States Public Health Fellow; Dr. Claire Winestock and Professor Lewis P. Rowland from the Department of Neurology; and two graduate students and an assistant.

Dr. Parythchery Srinivasan has continued studies on the biosynthesis of aromatic amino acids and has partially purified the enzyme capable of condensing D-erythrose-4-phosphate and phosphoenolpyruvate. The properties of the enzyme with respect to substrate specificity cofactors pH and K_m have been determined. The product of the enzymatic condensation has been identified as 2-keto-3-deoxy-7-phosphoglucoheptonic acid. The mechanism of conversion of the above compound to 5-dehydroquinic acid is also being investigated.

Professor David B. Sprinson and his collaborators have been continuing their studies on the role of folic acid in one-carbon metabolism, and on the biosynthesis of aromatic amino acids.

Professor Stephen Zamenhof has continued his studies on incorporation

of natural and unnatural pyrimidines into deoxypentose nucleic acids, with particular reference to the new synthetic pathways and the genetical effects. He has also continued his studies on the transforming principle, in collaboration with Professor Hattie E. Alexander of the Department of Pediatrics. Dr. Sheldon Greer also participated in this work.

Ten visiting lecturers have contributed to the seminar program: Dr. Hugh Huxley, University College, London; Dr. George J. Alexander, Worcester Foundation for Experimental Biology; Dr. Bernard D. Davis, Harvard University; Dr. Paul D. Boyer, University of Minnesota; Dr. Britton Chance, University of Pennsylvania; Dr. Hans Kornberg, Oxford University; Dr. E. Lester Smith, Glaxo Laboratories, Ltd., England; Dr. Boris Magasanik, Harvard University; Dr. Jack H. Schulman, School of Mines, Columbia University; and Professor E. Klenk, Koln, Germany.

Dental and Oral Surgery

EXECUTIVE OFFICER: Professor Gilbert P. Smith

The School of Dental and Oral Surgery has completed this academic year with a spirit of enthusiasm and hope. The morale of the staff and student body has been high. Improvements in the physical plant have been a contributing factor and are widely appreciated.

The creation of a well-equipped orthodontic laboratory and the installation of modern equipment in, and the rehabilitation of, the ninth-floor technique laboratory have relieved the acute shortage of teaching laboratories. The clinical research laboratory has been rearranged and equipment for chemical analysis has been installed permitting greater service to the clinical staff. The dental materials section has been moved to a larger laboratory which provides expanded facilities and which accommodates an entire class, eliminating the need of conducting each course in two sections.

Much must be achieved before an adequate physical plant can be realized. Over-all space is totally inadequate, no division has sufficient space and facilities to carry on its activities effectively or efficiently. Staff office space, staff laboratories, research laboratories and equipment for them are minimal. Clinical space is limited and the equipment obsolete. Technique laboratories need further improvement. Corridors are dangerously crowded and cluttered with lockers, porter's carts, and other impedimenta. Student study and recreational facilities are nonexistent.

The continued depletion of the staff is of growing concern to the department. Deaths, retirement, and resignations in recent years have taken a

heavy toll of key members who have not been replaced. As of April 15 there were but three geographic full-time professors and seven geographic full-time associate professors on the staff of the department. There are no full-time professors or associate professors on the staff. There are no basic science members assigned to the department to conduct research in the dental field.

It is with deep regret that the death of Professor Lewis R. Stowe is reported. His many years of distinguished service to the School of Dental and Oral Surgery, to Presbyterian Hospital, and to affiliated institutions were major contributions to the dental service of the Medical Center.

Professor Barnet M. Levy resigned as of August 31 to accept an appointment as a professor at the University of Texas School of Dentistry. Another loss to Columbia is the resignation, on May 1, of Professor Saul Schluger, of the periodontology staff, who has accepted a post as head of the Department of Periodontology at the University of Washington School of Dentistry.

Much credit is due Professor George W. Hindels for his tireless energies in organizing and sponsoring a chartered flight and conducting a Columbia contingent to the International Dental Congress held in Rome last September.

An important bequest was received from the estate of Julia K. Robinson which endows a chair to be known as the Dr. Edwin S. Robinson Professor of Dentistry. Professor Edward V. Zegarelli was named to become the first incumbent as of March 1.

The teaching program completed this academic year was based upon the undergraduate curriculum as established in 1955. The transition from the previous curriculum has been completed, and the stresses produced by rearrangement of course schedules have been eased.

The postgraduate activities have continued at as high a level as staff and facilities permit. The Postgraduate Faculty Committee has prepared an outline for an improved basic course for Certificate of Training students, and this has been incorporated in a projected training course for dental teachers and researchers.

The class entering in September, 1958, was filled by April 1, 1958. The Admissions Committee, under the chairmanship of Professor Joseph A. Cuttita selected forty students to enter this coming September, from 276 colleges. Unfortunately, as in the past few years, the quality of applicants continued to be poor, and the number of students applying decreased slightly.

As of July 1, 1957, all dental school admissions, including postgraduate admissions, were centralized in the Admissions Office. As in the past, a very large number of applications were received for the certificate course in orthodontics. These applications come from all over the country and from foreign countries as well. Applications for the other certificate courses in periodontology, pedodontics and oral surgery were also received but not in

as great numbers. The problem of inadequate space and facilities continues to limit the postgraduate teaching program.

There were also a large number of applicants for the noncredit courses for general practitioners and for the intensive short courses designed to meet the needs of recognized orthodontists for training in a particular aspect of their specialty.

DENTAL CLINIC

During the eleven-month period May 1, 1957, to March 31, 1958, 47,153 visits were made by patients to the dental school clinic, of which 12,384 visits were made to the diagnosis section, 13,039 visits to the general restorative clinic, 1,079 visits to the hospital dentistry clinic, 10,718 visits to the oral surgery clinic, 7,912 visits to the orthodontia clinic, 1,085 visits to the pedodontia clinic, 296 visits to the temporomandibular joint clinic, and 640 visits to the oral hygiene clinic. In addition, there were approximately 8,100 visits to the radiology section, and 4,178 new patients were admitted to the clinic, of whom 642 were referred by the Presbyterian Hospital.

DIVISION OF CLINICAL ORAL PHYSIOLOGY

Under the direction of Professor Laszlo Schwartz, the division has concentrated its efforts upon the completion of a book on temporomandibular joint disorders. Professor Schwartz presented the conclusions reached through the research of the clinic at a conference held by the W. K. Kellogg Foundation Institute, Graduate and Postgraduate Dentistry, at the University of Michigan.

During the year, sessions of the temporomandibular joint clinic were increased from one to four.

Professor Eli S. Goldensohn of the Department of Neurology, Professor Melvin Moss of the Department of Anatomy, and Professor Gerhart S. Schwarz of the Department of Radiology, gave lectures in this course.

DIVISION OF DENTAL HYGIENE

The Courses for Dental Hygienists were directed by Professor Frances A. Stoll.

Twenty students registered for the Bachelor of Science degree. The matriculated students come from eight states.

The Dental Hygienists Alumnae Association granted three scholarships. The dental school scholarship was awarded to a senior student.

The Anna V. Hughes Loan Fund has been in use. A senior student was granted \$300 for payment of tuition in February, 1958. Scholarships will be offered again by the Alumnae Association. It is apparent that there will be

need for additional scholarship funds in September, 1958, when the tuition increase goes into effect, particularly for the senior students who have budgeted their expenses based on the tuition fees of 1957-1958.

Plans are under consideration for a Career Conference on the education of the dental hygienist. It will be held in the School of Dental and Oral Surgery during October, 1958. Guidance counselors and interested students of high schools, junior colleges, and women's colleges will be invited.

The Medical Center Clinic for dental prophylaxis functioned throughout the school year in the Ogur Room. As of March 20, 445 patients were treated during seventy-seven clinic sessions. A five-chair clinic was operated in St. Rose of Lima and St. Catherine of Genoa as demonstration schools. All children who, during the dental inspection, were found with unclean teeth received a prophylaxis. During the week of April 7, students examined and instructed the children of the Agnes Russell School, Teachers College.

New appointments to the oral hygiene staff during the year were Rosemarie Lusso and Patricia A. McLean as instructors in dental hygiene, Dr. Agate Suurkivi as assistant in dentistry. Resignations were accepted from Jane Dwyer and Ann R. Kotsubo, instructors in dental hygiene.

DIVISION OF OPERATIVE DENTISTRY

Under the direction of Professor Carl R. Oman, the division has confined its teaching to the undergraduate student body. The staff contributed to the dental literature and has been active in dental organization affairs, presenting a number of short courses and many lectures.

Research has been active in spite of heavy teaching responsibilities. A new ultrasonic prophylaxis unit is being studied by Professor Oman and others, chiefly members of the periodontia staff. Students have been given an opportunity to prepare cavities in extracted teeth via the ultrasonic method. High-speed rotary methods of tooth cutting are being demonstrated, and students are being made aware of newer developments along those lines in seminars and lectures.

Professors Harold Sherman and Joseph Fiasconaro are studying the quantitative action of a local anesthetic, carbocaine, and algesimetry of antipyretics via plethysmography.

Professors Edward A. Cain, Edmund Applebaum, and Harry Shapiro, and Dr. Thomas Portway are conducting a study of methods of high-speed cutting of tooth structure and their clinical and histologic effect.

Dr. Kenneth C. Deesen has perfected a clinical camera which is an excellent medium for teaching. The teaching of operative techniques to freshmen students is under way and serves to introduce the more interesting phases of clinical dentistry to the student at an earlier period of his development.

Professor Irwin D. Mandel has collaborated in presenting etiology of dental caries. Histopathology as it relates to tooth preparation is presented

to freshmen and sophomore students in Professor Cain's lecture courses and technique sessions.

DIVISION OF ORAL SURGERY

This division, directed by Professor William J. Savoy, has improved its staff status by the appointment of Drs. Paul Schneider and Daniel Schube. The entire staff has been alerted to gain qualification in either or both the American Board of Oral Surgery and the New York Board.

A subsection of this division, that of a separate staff of general anesthesiologists, is unique in the dental schools of this country. This staff, under the direction of Professor Morris Fierstein, has been augmented by the appointment of Dr. Irving S. Silver. The teaching of undergraduate and postgraduate students in general anesthesia has been undertaken.

Research activities have been carried on in collaboration with, and with the assistance of, other divisions of the school. This division is expanding its own research and shall begin studies on bone extracts.

Professors Alvin S. Nathan, Robin M. Rankow, Morris Kavelle, Bertram Klatskin, Theodore Bundrant, and Fred Rothenberg have assumed their lecturing assignments. Professors Bundrant and Rothenberg have continued their assignments to dental hygiene and orthodontics.

DIVISION OF ORTHODONTICS

Professor Nicholas A. DiSalvo assumed the direction of the orthodontic division on July 1, 1957.

The undergraduate course for juniors has been reorganized. The emphasis as in the past is on growth and development, etiology of malocclusion, preventive orthodontics, and simple orthodontic procedures which are properly considered to be within the realm of the general practice of dentistry. The undergraduate course for seniors remains chiefly a clinic and seminar type of instruction enabling students to observe and carry out simple corrective procedures on practical cases.

The postgraduate curriculum has been reorganized to provide better sequence of basic science courses. Some new courses have been added, namely, a course in principles of occlusion, one in advanced roentgenology, one in therapeutics, and one in pathology. Three concentrated short courses were given: applied cephalometrics by Dr. Henry I. Nahoum, extra-oral therapy by Professor James Jay and Dr. Jack M. Breuer, and edgewise appliance therapy by Professor Clifford L. Whitman and Dr. Francis J. Loughlin. Thirty-eight practicing orthodontists from all parts of the United States attended these courses.

Dr. Julius Tarshis, in cooperation with Professor Robin M. Rankow of the Division of Oral Surgery, has completed a color motion picture film showing the cooperation of orthodontist and oral surgeon in the surgical treat-

ment of mandibular prognathism by bilateral condylotomy, a new procedure at this Medical Center.

The orthodontic clinic supplies service to more than 1,200 patients each year and also supplies the necessary material for the practical instruction of postgraduate students. These patients make more than 8,800 visits each year.

Drs. Nahoum and Edmund W. Burke are continuing the serial study of occlusion in children. Drs. Abraham M. Blechman and Gustave Lasoff are conducting a pilot study in clinical electromyography. Drs. Blechman and Solomon L. Katz are making further advances in techniques of radiography and cineradiography of the temporomandibular joint. Dr. Jerome M. Sorrel, with the cooperation of the Department of Urology, is studying the effects in children of administration of anterior-pituitary-like substances upon development of the jaws and occlusion. Dr. Sidney L. Horowitz is continuing analysis of data concerning occlusion, arch dimension, and cephalography in identical twins. Dr. Aaron L. Ackerman is cooperating with the Children's Hospital of Philadelphia in investigating the effects of arch expansion in the treatment of children who are mouth breathers.

The division is cooperating with Professor Edward A. Cain, Jr., of the Division of Operative Dentistry and Professor Edward Applebaum of the Department of Anatomy in a project to determine the immediate and long-range effects of high-speed operative procedures on the dental pulp. It is also continuing its cooperation with Professor Melvin Moss of the Department of Anatomy in a study to determine the time course of skeletal maturation in children. Dr. Saul N. Greenberg, in conjunction with Professor Moss is studying the migration of the mandibular dentition in patients undergoing orthodontic treatment. They are also making a longitudinal study of growth and development of occlusion in cleft-palate children, as well as following the position of metallic implants in monkey jaws.

Drs. Gustave Lasoff, Russell J. Vanacek, and Edmund W. Burke have joined the staff.

DIVISION OF PEDODONTICS

This division is under the direction of Professor Solomon N. Rosenstein.

One hundred and thirty-five children were admitted to the children's clinic for treatment. It has been the policy to admit appreciable numbers of preschool age children for treatment in the pedodontics clinic. This policy was instituted because of evidence of increasing incidence of caries in young children, and the dearth of adequate professional care available for them. Four postgraduate students were enrolled for pedodontics.

A new intensive course in dentistry in cerebral palsy was arranged to be offered for a two-week period in June. The course was developed at the request of the Bureau of Dental Health of the New York State Department

of Health, for eligible New York State dentists affiliated with cerebral palsy treatment centers.

Increasing emphasis is being placed on complete dental care for children with various types of handicaps. The need for development of a broad dental program for children with all types of handicaps has become evident during the seven years of operation of the cerebral palsy dental program, which includes the two-year full-time fellowship course, and a clinic program which operates during five half-days each week.

The research activities in pedodontics were developed to parallel certain phases of the pedodontics curriculum so that our findings can augment our teaching material and be integrated with it. Our research projects, some of which were included in last year's report and were continued, are in the following areas: caries incidence and prevention; applied dental development; tooth conservation; pre-medication for children with neuromuscular disorders.

Dr. Solomon Snyder joined the pedodontics staff as an assistant in dentistry and is serving in the cerebral palsy clinic.

DIVISION OF PROSTHODONTICS

Activities of this division, directed by Professor Gilbert P. Smith and comprising about 30 per cent of the assigned hours in the four-year undergraduate curriculum, have by necessity been centered on teaching activities. Professor Howard A. Arden and his staff are to be commended for the way in which they have concentrated on the presentation of material and have stimulated the students to greater efforts.

Clinical staff assignments of the division were as follows: Professor Arden in charge of oral anatomy, prosthetic technique, and crown and bridge technique courses; Professor Robert E. Herlands, of clinical crown and bridge courses; Professor George W. Hindels, of clinical removable partial denture work; Professor John J. Lucca, of clinical complete denture work; and Professor Herbert D. Ayers, Jr., of the course in dental materials.

Professor Ayers has conducted research on solder joints using autoradiographs produced with Fluorine-18, the physical properties of a number of new impression materials and the properties of amalgams; Dr. Sebastian A. Bruno, in collaboration with Dr. Joseph Luban, on velo-pharyngeal closure during speech; Professor Herlands on the biologic compatibility of pontic material used for crown and bridgework; Professor Hindels on various rest forms for removable partial dentures; Dr. William C. Hudson, Jr., on rubber impression materials and asymmetries of dental structures; Professor Lucca on the splinting of teeth for dental restorations; Professor Max A. Pleasure on thiokol impression material for complete denture construction; and Dr. Ennio L. Uccellani on the use of tranquilizers in registering mandibular relation.

Staff members have contributed extensively to dental organization activities. They have delivered fifty-one lectures and clinics, and have published eight papers. Five have served as consultants in prosthodontics on the staffs of Veterans Administration and United States Public Health Service hospitals; three hold dental society offices. They also serve on nineteen committees for dental societies.

Division staff members conducted courses away from Columbia: Professor Cohn on the principles of occluso-rehabilitation at the Tufts School of Dentistry; Professor Hindels on removable partial dentures at the Orange County Community College; Professor Lucca on crown and bridgework at the Orange County Community College; and Professor Lucca and Dr. Caronia, on prosthodontics at Dallas, Texas, and Tulsa, Oklahoma.

Professors Max A. Pleasure and Gilbert P. Smith were honored by admission to fellowship in the American College of Dentists at the annual convocation in November at Miami, Florida.

Dr. Victor S. Caronia joined the staff as an assistant in dentistry in September, filling the vacancy created by the resignation of Dr. John D. Suomi.

DIVISION OF STOMATOLOGY

Professor Edward V. Zegarelli directs this division, which covers the areas of oral diagnosis, roentgenology, periodontology, dental therapeutics, and the clinical laboratory.

New appointments to the staff during the past year were Drs. Robert Walsh, Robert Umans, Morton Karmiol, Joseph O'Connor, Adeline Conti, and Charles Berman. Resignations were tendered by Drs. Marcella R. Halpert and Lester E. Rosenthal.

Professor Zegarelli has been appointed the Dr. Edwin S. Robinson Professor in Dentistry, the first endowed chair in the School of Dental and Oral Surgery. Dr. Austin H. Kutcher has been re-elected secretary-treasurer of the American Association of Dental Editors. Professors Joseph A. Cuttita and Jack Budowsky have been elected fellows of the American College of Dentists at its last annual meeting in Miami, Florida.

The scope and importance of the activities of this division are growing constantly. Most of the staff are volunteer members who can only contribute a very limited amount of time to the school.

Professor Budowsky has assumed responsibility for instruction in radiologic techniques, thus freeing Professor Cuttita, who has assumed increased teaching duties in oral diagnosis. Dr. Kutscher has assumed responsibility for the course in dental therapeutics, an area of growing importance in dental education. Professor Irwin D. Mandel has assumed charge of the clinical laboratory. During the past year the laboratory has prepared over one hundred biopsy specimens, prepared teaching material for courses in

dental caries, periodontology and stomatology, prepared material for a course in microbiology for the hygiene students, done bacteriologic culture work for the section of endodontia, carried out antibiotic sensitivity tests for the Division of Oral Surgery and has prepared histologic research material for members of the periodontia staff.

Professor Frank E. Beube continues his responsibility as head of the section of periodontology, directing its research program as well as its undergraduate and graduate curriculum.

Members of the Division of Stomatology have delivered 176 papers or lectures, including twenty short courses, before local, state and national societies, dental schools, hospital staffs, and foreign organizations during the past year. Professor Zegarelli delivered a series of eight lectures at the Orange County Community College as part of a graduate course in oral medicine. He also participated in an educational program at the United States Public Health Service Hospital on Staten Island. He delivered another series of lectures as part of a graduate course in oral medicine at the Medical College of Virginia. Professor Cuttita presented a series of lectures in diagnosis and roentgenology before the staff of the Veterans Administration Hospital at Castle Point, New York. Professor Budowsky presented a paper before the International Dental Congress in Rome, Italy. Professor Beube presented a number of graduate courses in periodontology before such groups as the American Dental Society of Europe in Switzerland, the Israel Dental Association in Tel-Aviv, the Hebrew Dental School in Jerusalem, and McGill University in Montreal. Professor Schluger presented courses in periodontology at the University of Washington, the University of North Carolina, and Temple University. Professor Robert Gottsegen completed a series of eight lectures before the dental staff of the United States Public Health Service Hospital on Staten Island. Professor Lewis Fox participated in a number of graduate courses in periodontology before such institutions and societies as the University of North Carolina, University of Pennsylvania, University of Oregon, and the Fourth District Dental Society of New York State. Members of the division published sixteen papers during the past year and have thirteen papers in press.

The research program includes the study of the value of bone extract for the repair of cementum and bone, by Professor Beube and his co-workers; an investigation of the use of various topical preparations in periodontal therapy, by Drs. Charles L. Berman and Irving B. Stern; a study of mandibular movements by means of electronics, by Dr. Stern; the relation of occlusal traumatism with gingival inflammation, by Dr. Seymour Albus; the use of ultrasonics in periodontics, by Drs. Ellen N. Hosiosky and Bernard H. Wasserman; the inhibitions of calculus formation with mucolytic and chelating agents, by Dr. Wasserman; and periodontal healing following pulp removal, by Professor Melvin L. Morris.

Members of the section of diagnosis and roentgenology are in the midst

of research program with the emphasis on such studies as oral manifestations of Jegher's syndrome and pemphigus, congenital diseases of the mouth such as familial white folded hypertrophy of the oral mucous membranes, the efficacy of thiostrepton in the management of oral disease, the relation of denture wearing to the incidence of oral monilial infection, the usefulness of various vehicles for applying therapeutic agents to oral mucosal structures, the clinical evaluation of new topical anesthetics, the effectiveness of new topical corticosteroids in the treatment of chronic gingival and mucosal diseases.

Investigations are being continued on the nature, etiology, and therapy of such diseases as the cementomas, idiopathic bone cyst, recurrent ulcerative stomatitis, desquamative stomatitis, and the keratoses.

Expanding studies are anticipated in regard to radiation exposure of the patient and dentist through use of cadaver test subjects. Another phase of research with considerable merit is that of the relation of dental treatment to the onset of hepatitis. This investigation will be carried on with the active interest and aid of members of the Department of Medicine.

Professor Mandel is continuing his studies on the relation of salivary composition to oral disease and, collaborating with Professor Solon A. Ellison of the Department of Microbiology, Professor Mandel is also investigating the immunochemical composition of human saliva. Dr. George Stein is continuing his research on the effect of protein deficiency on oral structures and the oral manifestations of experimentally produced nutritional deficiencies.

COMMITTEE ON DENTAL RESEARCH

Research activity continues at a constantly increasing pace. During the past year thirty-two protocols concerning anticipated research projects were reviewed and approved by the Committee on Dental Research. Thirty-five manuscripts from members of the dental faculty were similarly reviewed and approved for publication, thirty-six were published and nine others are in press in dental, medical and allied scientific journals.

Research facilities are woefully deficient. With availability of increased space there would undoubtedly result an even greater enthusiasm for participation in research by a larger number of our faculty.

Of as great importance as the need for expanded research facilities is the necessity for increased financial support. A number of desirable research projects are either being curtailed, are proceeding very slowly, or are being held in abeyance because of insufficient funds.

Professor Zegarelli, chairman of the Committee of Dental Research, has been re-appointed chairman of the Council of Scientific Research of the New York State Dental Society. Projects intended to stimulate and enliven research interest among the dental practitioners of the state as well as to

gather valuable clinical information and statistics have already been initiated in certain regions of the state and will be expanded to a state-wide basis in the near future.

During the past year six part-time research fellowships awarded to undergraduate dental students and supported by the National Institute of Health provided a welcome source of research personnel. Six new students have been chosen for the coming year and efforts are being made to increase the number of fellowships allotted to this school.

Two post-sophomore research fellowships were accepted from the National Institute of Health by students Edward Herzig in the Department of Physiology and Michael Mage in the Department of Microbiology.

Dermatology

EXECUTIVE OFFICER: Professor Carl T. Nelson

During the academic year there were no major changes in the curriculum for undergraduate students or in the graduate training program for residents and fellows in dermatology. The year afforded the department an opportunity to consolidate the gains recently made in its physical facilities within Presbyterian Hospital and to integrate the enlarged residency staff into its teaching and training activities.

Changes in the staff during the year included the retirement of Professor George C. Andrews after thirty-five years of association with the department. An outstanding clinician and author, Professor Andrews has been particularly interested in the treatment of cutaneous neoplasms and for many years has been in charge of the dermatologic radiotherapy section of Vanderbilt Clinic.

It is a pleasure to record the following promotions: to assistant clinical professor, Dr. Anthony N. Domonkos; from instructor to associate, Dr. F. Philip Lowenfish; from assistant to instructor, Dr. Bohdan Dobias.

As in previous years several visitors from this country and abroad participated in the educational activities of the department. These included Dr. H. N. Chun, professor of bacteriology, Chonnam University, Korea; Professor Ernest A. Fairburn, University of Birmingham, England; Professor Kentaro Higuchi, Kyushu University, Japan; Professor S. Ilich, Belgrade University; Professor Theodore Inderbritzen, University of Zurich; Dr. Geraint James, Middlesex Hospital, London; and Dr. Manouchehr Sedghi, director of laboratories for the Iranian government. Among the dis-

tinguished visitors from this country who conducted conferences and seminars were Professor Leonard T. Chavkin, Mr. John Reynolds, Drs. Maurice J. Costello, Jarek P. Fisher, and Henry E. Michelson. Their contributions to the teaching activities of the department are gratefully acknowledged. Drs. Michael J. Ressetar, Edward Hawkins, and Alexander Roublev attended the dermatologic clinic as visiting physicians during the year. Drs. Hawkins and Roublev are graduate students in the School of Public Health and Administrative Medicine.

The clinical investigative and research programs of the department continued at a high level during the year. Professor Leslie P. Barker continued an investigation of biotin levels in the blood of infants with various types of erythroderma. In collaboration with Professor Dorothy H. Andersen of the Departments of Pathology and Pediatrics, Professor Barker also continued the histologic investigation of developmental variations in fetal and infant skin.

Professor Helen O. Curth, with Mr. I. Lester Firschein, continued the long-term study of acanthosis nigricans. This investigation has been broadened to include observations on the genetic pattern of this disease, in addition to its relationship to visceral cancer. Professor Curth also continued the study of Behcet's syndrome.

Dr. Dobias, with Dr. Irving Abrahams, extended an investigation of the properties of an endotoxin obtained from *Candida albicans*.

Professor Domonkos continued the investigation of neutron activation analysis of arsenic in the skin of patients with cutaneous epitheliomas and keratoses. He also made further observations on the therapeutic value of local injections of corticosteroids in various dermatoses. Professor Paul Gross and Dr. Saul Sanders have initiated a study of the alkali-neutralizing capacity of human skin in various eczematous diseases. This work also includes an investigation of the influence of vitamin A and certain unsaturated fatty acids on the alkali-neutralizing properties of the skin and the possible therapeutic effects of these substances in so-called nummular eczema. Dr. Lowenfish studied the value of combinations of corticosteroids with various fungistatic agents in the local treatment of superficial dermatophytosis.

Professor J. Lowry Miller and Dr. Justina H. Hill initiated an investigation of the comparative value of the Reiter protein complement fixation test and the *T. pallidum* immobilization reaction in the detection of syphilis. In collaboration with Drs. Marvin Brodey and Norman A. Parrott, Professor Miller and Dr. Hill have also continued the long-term study of the significance of persistent biologic false positive reactions to the standard serologic tests for syphilis in otherwise normal individuals.

Drs. Leo Schweich and John T. McCarthy extended their clinical investigation of the value of a combination of anti-malarial drugs in the treatment of chronic discoid lupus erythematosus.

Professor Margarita Silva, with Mr. J. Dennis Pollack, Miss Helen Buckley

and Dr. Elizabeth Hazen, continued the study of the nutritional requirements of dermatophytes. Dr. Silva has also investigated the nutritional requirements of *Pityrosporum orbiculare*, and in collaboration with Professor Beatrice M. Kesten and Mrs. Josephine Gomez, has undertaken studies to assess the etiologic significance of this lipophilic yeast in tinea versicolor.

Dr. Abrahams and Professor Nelson extended the study of the nature of the chemical complexes concerned in the Kveim reaction in sarcoidosis. Certain phases of this investigation were undertaken in collaboration with Dr. W. G. Strawbridge of the Royal Infirmary, Cardiff, Wales.

During the year members of the department continued their customary interest in the activities of various scientific and educational organizations. Eight members of the department attended the Eleventh International Congress of Dermatology in Stockholm from July 31 to August 6, 1957. Participants in the proceedings of the Congress were: Professors Helen Curth, Domonkos, Kesten, Miller, Nelson, and Theodore Rosenthal, and Drs. William Curth and Max Liebman. Sixteen members of the department lectured before thirty-nine other scientific assemblies during the year and six participated in the symposia and postgraduate educational programs of the American Academy of Dermatology and Syphilology. A total of thirty-five papers were published by members of the department during the academic year.

Several well-deserved distinctions and honors came to members of the department during the past year. Professor Barker was elected secretary of the Section on Dermatology of the New York Academy of Medicine, and Professor Domonkos served as chairman of the Panel of Dermatologic Photography at the annual meeting of the American Academy of Dermatology and Syphilology. Professor Helen Curth lectured at the Armed Forces Institute of Pathology, Washington, D. C., and also addressed the Baltimore Dermatological Society. Professor Gross became president of the Manhattan Dermatological Society and Professor Kesten continued to serve as secretary of the American Board of Dermatology. Professors Gross and Kesten also lectured at the American Academy of Allergy. Professor Miller and Dr. Hill participated in the ninth annual symposium on recent advances in the study of venereal diseases. In addition, Professor Miller was elected president of the New York Dermatological Society and also served as chairman of the Section of Dermatology and Syphilology of the Medical Society of the State of New York. Dr. Lowenfish was appointed director of dermatology of the Elmhurst General Hospital and Professor Silva participated as a guest lecturer in a course on "Principles of Mycotic Disease" at the Armed Forces Institute of Pathology, Washington, D. C. Professor Nelson was made an honorary member of the Société Française de Dermatologie et de Syphiligraphie. He also continued as a member of the Committee on Cosmetics of the American Medical Association and of the Subcommittee on the Cutaneous System of the National Academy of Sciences. He also was elected treasurer of the American Dermatological Association.

Medicine

EXECUTIVE OFFICER: Professor Robert F. Loeb

During the thirty years since the opening of the Medical Center, substantial additions have been made to the laboratories of the Department of Medicine. These include not only additions at the Center but also at Bellevue Hospital, at Goldwater Memorial Hospital, and at Francis Delafield Hospital. Despite this, the gap has widened between the research facilities available and those needed to exploit to the fullest extent the capacities of young physicians well trained in the basic sciences, who have demonstrated their research ability. To correct these deficiencies it is imperative that extensive additions to the research facilities for the medical sciences be provided in the immediate future.

Three concrete examples may be mentioned: First, chronic nontuberculous disease of the respiratory tract is rapidly becoming more prevalent. In the years that lie ahead it will impose an increasing burden on society because it inevitably leads to chronic invalidism in the older age groups. The pioneer studies of Professors André Cournand and Dickinson W. Richards and of Professor Alvan L. Barach have clarified greatly disturbances in cardio-respiratory function *pari passu* with the advance of the disease process. The time has now come for a more comprehensive attack upon the problem. This should include studies of genetic and constitutional factors as well as long-term studies of the victims of these disorders and of their families in relation to the precise microbiological nature of their recurrent infections. The role of environmental factors such as tobacco, "smog," and dusts, deserves more intense scrutiny. Beyond these approaches but interdigitated with them should be included electron microscopic studies of the changes in the lung structure in these patients and studies of the chemical nature of the supporting lung tissue as contrasted with the normal. Second, the problems of aging are admittedly of growing concern. It is thoroughly appreciated that this field will advance only insignificantly if limited to observations made on octogenarians. Long-term disease, most of which involves the older age groups, has been under intensive study for twenty years at the Columbia Research Division at the Goldwater Memorial Hospital under the direction of Professor David Seegal and a distinguished group of colleagues. Significant contributions have been made to our knowledge of arteriosclerosis, cirrhosis of the liver, hypertensive vascular disease, rheumatoid arthritis, and nontuberculous disease of the lungs. These studies

should not only continue but should be extended. Furthermore, full exploitation of the problems of aging is not possible without consideration of the enzymatic, hormonal, and other biochemical changes such as are exhibited in the chemical structure of proteins and polysaccharides and are reflected grossly in organ dysfunction with the advance of time. Thus, intermediary metabolism and probably genetic considerations should be pursued intensively if the fundamental problems of aging are to be resolved. Third, the growing importance of studies in human genetics becomes more and more apparent by virtue of the great array of inheritable disorders now recognized in inborn errors of metabolism or in specific enzymatic defects. In many diseases heredity factors have become apparent clinically although their basic nature is still unresolved. It is also highly probable that inherited factors have not been recognized in countless other diseases as, for example, in the aging process and in nontuberculous disease as mentioned above.

Additional facilities alone will not solve the problem of the fullest exploitation of our research potential. Financial considerations are equally important. Funds must be found for the continued support of additional investigators and additional funds must become available to increase the salaries of those who are dedicating their careers to the full-time pursuit of research, teaching, and patient care without the financial rewards of private practice.

A number of changes of major importance take place in the staff of the department this year. Professor Dana W. Atchley becomes professor emeritus of clinical medicine and consultant to the Presbyterian Hospital. Happily, staff, students, and patients will continue to remain the beneficiaries of his stimulating influence, for he will continue to practice in the Harkness Pavilion and will do some teaching on a voluntary basis.

Promotions in the department, effective July 1, 1958, are as follows: from associate professor to professor, Stanley E. Bradley, Yale Kneeland, George A. Perera and John V. Taggart; from associate professor of clinical medicine to professor of clinical medicine, Charles A. Ragan and Joseph E. Turner; from assistant professor to associate professor, Alfred P. Fishman and René Wégria. At the Francis Delafield Hospital: from associate professor to professor, Alfred Gellhorn, who is in charge of the medical service and director of the Institute of Cancer Research at Columbia. At the Goldwater Memorial Hospital: from assistant professor to associate professor, Quentin B. Deming and Arthur R. Wertheim; to assistant professor, Dr. Daniel Rudman. At the Medical Center: to assistant professor of clinical medicine, Drs. Henry Aranow, John M. Baldwin, Stuart W. Cosgriff, Felix E. Demartini, John H. Laragh and Helen M. Ranney.

During the past year two more members of the department, Professors André Cournand and Dickinson W. Richards have been elected members of the National Academy of Sciences. Professor Taggart has been named career investigator of the American Heart Association and has elected to remain in this capacity at Columbia. Professor Taggart is the first member of a

department of medicine to receive this important distinction. Professor Richards was elected an honorary fellow of the American College of Surgeons. Professor Cournand received the degree of Doctor Honoris Causa from the University of Strasbourg. Professors Cournand and Richards both were awarded citations by the American Heart Association. Professors Deming and Paul A. Marks, and Dr. Laragh were elected members of the American Society for Clinical Investigation. Professor William B. Sherman was made chairman of the Board of Allergy of the American Board of Internal Medicine. Professor Perera joined the editorial board of *Circulation Research*. Professor Joseph W. Jailer was appointed to the editorial board of the *Journal of Clinical Endocrinology* and became consultant to the Department of Education and Research of the Veterans Administration. Professor René Wégria spent three months at Leopoldville in the Belgian Congo as visiting professor of medicine at the Louvanium University. He also was the first honor lecturer at Hahnemann School of Medicine in Philadelphia and guest professor at St. Louis University. Dr. Calvin H. Plimpton is continuing to serve as professor of medicine at the American University in Beirut, Lebanon. Professor Atchley acted in the capacity of consultant for the Rockefeller Foundation for the appraisal of medical education in Brazil and Colombia. He also delivered the Convocation Address at the Medical School of the University of Minnesota. He is a member of the Planning Committee of the 1958 Institute on Clinical Teaching of the Association of American Medical Colleges. Professor Ragan will deliver the Heberden Oration in London this year and has been appointed to the Advisory Council of the Institute for Arthritis and Metabolic Diseases of the National Institutes of Health. Professor Bradley lectured at Oxford and at McGill Universities in addition to universities in this country. Professor Karl Meyer lectured at the International Symposium on Enzyme Chemistry in Japan and also at the All India Institute for Medical Sciences in New Delhi. Professor Forrest E. Kendall presented a paper at the International Congress of Gerontology in Italy. Professor Alfred Steiner lectured before the Dominican Republic Medical Society. Professor David Seegal served as visiting professor of medicine at the University of Buffalo. Professor Fishman delivered the "Dean's Lecture" at Louisiana State University. Professor Barach was made president of the Research Education Foundation. Professor Gellhorn served as visiting lecturer at the University of California and has been appointed chairman of the Serving Committee of the American Association for Cancer Research. Professor Elliott F. Osserman delivered the Memorial Lecture of the Radiological Society of North America. Professor Marks participated in the postgraduate course on fundamental biological chemistry at the United States Army School of Medicine. Professor Robert F. Loeb was named recipient of the Kober Medal of the Association of American Physicians for 1959. Numerous members of the staff in addition to the above mentioned, have delivered lectures at various medical schools and professional societies.

Professor Bradley has continued investigations of renal and hepatic physiology in man and animals, in collaboration with Drs. Henry O. Wheeler, Salvador U. Vial, and William I. Cranston. Dr. Robert M. Epstein of the Department of Anesthesiology has worked regularly in the laboratory. Dr. Wheeler has made measurements of bromsulfalein (BSP), transfer maxima (T_m), and storage capacity in a large series of patients and normal volunteers. The preparation of a group of trained dogs fitted with Thomas fistulae, by which bile may be collected quantitatively without need for anesthesia or external fluid loss has made possible a direct study of biliary secretion. At present the factors determining bile flow are under examination. Drs. Cranston and Vial have made a study of the adjustments in urine flow and composition in patients with uremia during orthostasis and elevation of intra-abdominal pressure. Dr. Epstein has completed a study of the partition of iodo-antipyrine.

The group of investigators working with Professor Taggart has continued its studies on metabolism and active transport in the kidney. In earlier observations on the renal tubular secretion of various carboxylic and sulfonic acids, attention has been focused on the anionic group as being of primary importance in the transport process. Drs. Alvin Essig and Thomas E. Morgan, Jr., have been engaged in the development of suitable methods for obtaining suspensions of isolated cells from the renal cortex. Dr. Geoffrey M. Kellerman, a Rockefeller Fellow from the University of Sydney, continued his studies on benzoyladenylate and hippuryladenylate, two compounds of potential interest in renal transport mechanisms. The enzymatic and nonenzymatic hydrolysis of these compounds was examined in collaboration with Professor David Rittenberg of the Department of Biochemistry through the use of water labeled with O^{18} .

In the past year the metabolism of salicylate in normal human subjects has been studied by Professor David Schachter. With sensitive spectrophotofluorometric methods salicylate and each of its principal conjugates have been estimated in plasma and urine. The renal mechanisms involved in their excretion have been described. Professor Schachter has also been studying certain aspects of the conjugation of bilirubin and glucuronides.

Professor Donald F. Tapley returned in July from a year's leave of absence which he spent with Professor H. A. Krebs in the Department of Biochemistry at Oxford. During the year in Oxford he and Professor George Kalnitsky developed a method for estimating oxaloacetic acid in tissues. With the help of Mr. William V. Shaw of the third-year class this investigation has been extended; normal levels of oxaloacetic acid have been measured in the livers of alloxan-diabetic rats. An investigation is currently in progress to determine the nature of the chemical interaction between thyroxine and mitochondria.

Studies from the laboratory of Professor Karl Meyer may be listed under two categories—structural investigations and applied problems. Among structural studies, Drs. Philip Hoffman and Alfred Linker and Professor

Meyer of the Department of Biochemistry are continuing work on heparitin sulfate, a mucopolysaccharide similar in chemical properties to heparin. The structure of this interesting mucopolysaccharide is being investigated by application of classical chemical methods and enzymatic degradation, the latter with the aid of enzymes obtained from a microorganism adapted either to heparin or heparitin sulfate. Among the applied problems should be mentioned two hereditary connective tissue diseases: Hurler's syndrome and Marfan's syndrome. The former, studied in collaboration with Professor Melvin M. Grumbach of the Department of Pediatrics, was shown to have a characteristic urinary excretion of chondroitin sulfate B and of heparitin sulfate.

Professor Marcel Goldenberg and Dr. Gerald Cohen of the Department of Biochemistry, in conjunction with Professor Bernard C. Holland of the Department of Psychiatry, have continued their infusion studies with adrenaline and nor-adrenaline.

During the past year Dr. Laragh extended his studies on electrolyte metabolism and hormonal factors in the production of edema. With Drs. Demartini and Henry O. Heinemann, Dr. Laragh carried out observations on the mechanism of action and the clinical usefulness of the new diuretic agent, chlorothiazide. Drs. Laragh and Helen M. Anderson with Professor Paul Brazeau of the Department of Pharmacology completed their studies demonstrating a normal capacity for potassium excretion in sodium-depleted dogs, despite the development of hyperkalemia which is now known to result from extra-renal mechanisms. Studies were carried out with potassium bicarbonate and chloride.

With Professor Seymour S. Lieberman of the Department of Biochemistry and Dr. Stanley Ulick in the laboratories of the Department of Obstetrics and Gynecology, Dr. Laragh studied the rate of secretion of aldosterone by the adrenal glands in man employing the tritium labelled steroid. The effects of salt depletion and of salt ingestion on the secretion of aldosterone in normal and hypertensive subjects have also been investigated. Dr. Laragh has studied certain aspects of the metabolism of nor-adrenaline in hypertensive disease with Dr. Goldenberg.

Professor Turner has continued his studies of blood lipids. With Dr. Anderson, the work is being extended to provide a more detailed account of tissue lipids in certain diseases, including hemorrhagic states. For these latter, Dr. Anderson has set up a laboratory and the techniques needed to differentiate coagulation defects in patients. The study of the synthesis and characteristics of hemoglobin has been extended by Dr. Ranney in patients and in experimental animals. In collaboration with Dr. Salome Gluecksöhn-Waelsch of the Albert Einstein College of Medicine, data are being collected on the hereditary transmission of the minor hemoglobin component in inbred strains of mice. The introduction of starch gel electrophoresis has made possible the application of a semi-quantitative technique to this problem. In view of recent studies of the heterogeneity of normal human hemoglobin, the problem of

genetic control of minor components in other mammalian species is of interest. Further studies of the electrophoretically rapid component of adult hemoglobin have been carried out in rabbits by Dr. Ranney.

Professor Perera has continued his studies of hypertension, particularly with reference to the accelerated ("malignant") form. A group of clinical observations has been gathered which suggest that "malignant" hypertension is a unique entity rather than a quantitative intensification of an antecedent hypertensive process. Some of the studies have been conducted with Dr. Gerald Adler. With Mr. Morton K. Rubinstein, a fourth-year student, a rapid method for producing the accelerated form of hypertension has been devised in rats.

The members of the cardio-respiratory laboratory under the direction of Professor Fishman continued their investigations on the relations between the respiration and circulation in normal men and in patients with heart or lung disease. The staff included six research fellows: Dr. Gerard M. Turino, New York Heart Association; Dr. Edward H. Bergofsky, Polachek Foundation; Dr. Martin Brandfonbrener, American Heart Association; Drs. Robin W. Briehl and Roberta M. Goldring, United States Public Health Service; and Gustave A. Laurenzi, National Foundation for Infantile Paralysis. They were joined in their research activities by Drs. John A. Wood and Raymond E. Barker of the Department of Medicine, Professor Aaron Himmelstein of the Department of Surgery, and Professor Sidney Blumenthal and Drs. Sylvia P. Griffiths and Beverly C. Morgan of the Department of Pediatrics. The studies on the pulmonary collateral circulation were completed. The diffusing capacity of the lungs for carbon monoxide and oxygen was compared at rest and during exercise by Drs. Turino and Bergofsky. In a parallel study, Dr. Briehl completed a mathematical consideration of principles involved in the estimation of the diffusing capacity for oxygen and derived a simplified method for its calculation. Other studies have included an elucidation of the characteristics of the pulmonary circulation by means of temporary occlusion of one pulmonary artery (Dr. Brandfonbrener), and analyses of the state of the respiration and circulation in kyphoscoliosis (Dr. Bergofsky), in pneumoconiosis (Dr. Goldring), and in bullous emphysema (Dr. Laurenzi). To accomplish these studies, new analytic tools have been incorporated into the laboratory armamentarium.

In collaboration with Drs. Jiro Nakana, John C. McGiff, Horst Zeckert, and Marvin R. Blumenthal, Professor Wégria studied the acute effect of three lesions—aortic insufficiency, mitral insufficiency, and arteriovenous fistula—on arterial blood pressure, coronary blood flow, cardiac output, work and oxygen consumption. In another series of experiments the same group of workers compared the effect on coronary blood flow and cardiac oxygen consumption, of an increase in cardiac work due to an increase in aortic blood pressure.

Professors Barach and Hylan A. Bickerman previously developed a method of inhaling hypertonic saline and propylene glycol aerosols for the

diagnosis of lung cancer. Condensation of various aerosols and water vapor on the respiratory tract is being studied by Professor Barach, Dr. Gustav J. Beck, and Professor Bickerman as a technique of deposition of therapeutic substances as well as aqueous mucolytic solutions. With Messrs. Evan M. Hersh and John R. Sachs, medical students, a comparative study of the effects of acclimatization and x-ray, and a combination of the two types of treatment of carcinoma 275 in mice was conducted by Dr. Beck and Professor Barach.

The Faulkner arthritis group under the direction of Professor Ragan has continued the program described last year. Dr. Charles L. Christian, a fellow of the Arthritis and Rheumatism Foundation, with Dr. André Peltier, a fellow from Paris, has characterized the material with which the rheumatoid factor reacts in the precipitin reaction as an aggregated 7S gamma globulin. Drs. Robert F. Willkins and Eric J. Southwood, trainees of the United States Public Health Service, have, in conjunction with Dr. William W. McLendon of the Department of Pathology, studied our post-mortem material of rheumatoid arthritis. Dr. Albert W. Grokoest's study of juvenile rheumatoid arthritis continues with striking abnormalities uncovered in the growth of the skeleton. Drs. Arthur I. Snyder and Ronald W. Lamont-Havers have compiled their experience with the nephrotic syndrome associated with systemic lupus. Dr. Henry H. Grossfeld, working in the Histochemical Laboratory of the Department of Orthopedic Surgery, has continued his study of the growth characteristics of fibroblasts in tissue culture. Dr. Demartini, with Drs. Laragh and Heinemann, is continuing his study of the renal excretion of urate. Cooperation between the Faulkner Group, the New York Orthopaedic Hospital, the Columbia Research Division of the Goldwater Memorial Hospital, and the Department of Surgery continues to be highly productive. Over the past year, studies have been continued by Professor Daniel L. Larson on the characterization of the abnormal substance present in the serum of patients with disseminated lupus erythematosus, (DLE). With Dr. John F. Watson, immunochemical studies were carried out comparing normal gamma globulin with gamma globulin from patients with DLE. With Dr. Willkins, isolation of the DLE factor was studied using column chromatography with a cellulose exchanger. With Dr. Christian and Dr. Ricardo Méndez-Brian, a fellow of the University of Puerto Rico, a system was devised for the detection of DLE factor in serum using polystyrene particles which had been coated with nucleoprotein.

The following fellows have been working in the endocrine laboratory of Professor Jailer: Dr. Julian I. Kitay, Commonwealth Fund; Drs. Donald A. Holob and Leonard V. Fisher, National Foundation for Infantile Paralysis; and Dr. Marvin S. Belsky, United States Public Health Service. Previous investigations were carried out with Dr. Nicholas P. Christy, Markle Scholar, on Cushing's syndrome due to bilateral adrenal hyperplasia. Drs. Kitay and Holob have perfected a technique for assaying minute amounts of ACTH which depends upon the release of corticosterone by isolated adrenal slices.

During the past year physiological and chemical studies of adrenal cortical function have been continued by Dr. Christy, with Dr. Adele D. Hofmann of the Department of Pediatrics. With Professors Jailer and Lieberman and Dr. Raymond L. Vande Wiele of the Departments of Biochemistry and Obstetrics and Gynecology, a study of the pattern of urinary 17-ketosteroid excretion in patients with adrenal cortical hyperplasia was carried out by Dr. Christy.

The studies by Professor Sidney C. Werner upon the pathogenesis of toxic goiter have been continued. A hyperthyroid patient with continued hyperfunction of the thyroid despite apparently complete surgical hypophysectomy has been studied with Dr. David V. Becker of the New York Hospital. With Professor Wellington B. Stewart of the Department of Pathology, a hyperthyroid patient was described with 95 per cent of her normal pituitary tissue destroyed by a chromophobe tumor. With the corollary view that a chromophobe tumor might be secreting ACTH. Professor Werner and Professor Melvin D. Yahr of the Department of Neurology obtained tissue from a patient with Cushing's disease and a large pituitary tumor causing destruction of the sella. The development of a method for thyrotropin assay has continued with Dr. Efraim Otero-Ruiz, a fellow from Colombia. Chromatography of the iodinated compounds in serum is being vigorously pursued by Professor Werner in conjunction with Dr. Richard J. Block of the Boyce-Thompson Institute. An investigation has been carried out to determine whether the abnormal response of the thyroid-pituitary relation found in hyperthyroidism is also present in pregnancy. Studies of antihormone formation are being conducted in collaboration with Professor Beatrice C. Seegal of the Department of Microbiology. The results of the study of the rate and extent of the thyroid's adaptation to small excesses of iodide, in conjunction with Professor Howard L. Levene of the Department of Mathematical Statistics, are almost completed and are to be reported.

Dr. Elliott J. Middleton, Jr., and Professor William B. Sherman have continued their studies on the release of histamine from cells of allergic blood when the antigen is added in the test tube. During the past year, Professor Kneeland and Mrs. Katherine M. Price have completed bacteriological studies of the lungs, trachea and heart's blood of 200 autopsied patients, with special reference to antibiotic therapy.

Professor Michael J. Lepore has extended his studies of the malabsorptive disorders. With Professor Harold G. Barker and Dr. Keith Reemstma of the Department of Surgery, he has continued his studies of the absorption of I^{131} tagged olive oil and oleic acid in nontropical sprue. He and Professor Barker are also studying patients with ileostomy by utilizing tagged fat techniques. With Dr. Frank Gump of the Department of Surgery, Professor Lepore is reviewing experience with the natural history and treatment of regional enteritis; a group of nearly two hundred patients has been followed for some years. With Professor Paul A. di Sant'Agnese of the Department

of Pediatrics and Professor Heinrich B. Waelsch of the Department of Biochemistry, Professor Lepore is studying the value of the gliadin tolerance test in the diagnosis of gluten-sensitive sprue.

During the past year Dr. Henry Colcher, Dr. James A. L. Mathers, and Professor Charles A. Flood have carried out studies of esophageal motility in achalasia of the esophagus, showing that propulsive motility is often partially rather than completely disrupted. Professor Flood, with Dr. George C. Hennig, has completed an evaluation of the long-term course of hiatus hernia.

Dr. Kermit L. Pines has extended observations on the value of oral hypoglycemic agents and is studying chlorpropamide, a new analogue of carbutamide. The study of vibratory perception he has carried on in collaboration with Dr. Hans M. Neuberg is nearing completion and is ready for analysis.

During the past year the use of anticoagulants in cerebrovascular disease has been appreciably extended by Dr. Stuart W. Cosgriff. The complications of bleeding occurring in patients receiving anticoagulants have been further evaluated, in an attempt to determine the safest possible therapeutic range for anticoagulant therapy.

Dr. Isidor Mufson has been studying the value of osseous venography in the differential diagnosis of edema due to peripheral vascular diseases. He has also resumed testing and improving a method of measuring peripheral blood flow and studying the potential value of corticosteroids injected intra-arterially in patients with active periphlebitis.

Through the generosity of the Gustavus and Louise Pfeiffer Foundation, a grant has been made to the College of Physicians and Surgeons which will enable an educational director and an assistant educational director for Social Service to be appointed. The College can thereby fulfill its responsibilities in providing field work for social work students and classroom instruction for nursing students, and in participating in the teaching of medical students. Funds have been granted for a three-year period, starting in 1957. The educational director and assistant educational director will be given appointments in both the Department of Medicine and the Social Service Department of the Hospital. The grant gives recognition of the contribution of a distinguished medical institution to social work education and to the role of the Social Service Department in carrying out all of its teaching responsibilities.

Social Service in this institution has provided field work placements for social work students for more than thirty years, working closely with the New York School of Social Work of Columbia University. Participation in the teaching programs for nursing students has been a continuing responsibility of Social Service since its inception, and for many years it has participated in the medical student program in cooperation with the School of Public Health. In 1954 a scholarship program was embarked upon, with the aid of the Pfeiffer Foundation, which made possible grants for second-year students, and for the first time in the history of social work education, a program in medical social work for advanced training beyond the Master's

degree. The School of Public Health and Administrative Medicine participated in this program during the two years that the program was in effect. Concentration and focus on the educational program has long been indicated, but plans were delayed while integration of the social service departments of Babies Hospital, Neurological Institute, and Presbyterian Hospital was fully effected and a stable patient-care program established.

AT BELLEVUE HOSPITAL

The First Medical and Chest Services have continued their active research programs during the past year. Professor Cournand, with Professors Harry W. Fritts and Himmelstein, has pursued the study of the effects of acetylcholine on the pulmonary circulation. Professor William A. Briscoe has completed his analysis of ventilation-perfusion relationships in the lungs of normal and emphysematous subjects. Professor Fritts and Dr. Charles A. Chidsey, using a dye-injection technique, have measured the blood flow through the bronchial circulation; Professors Cournand, Richards, Fritts, and Dr. Anne L. Davis have continued their study of the chemical stimuli to respiration, have analyzed the effects of oxygen inhalation upon total ventilation. Professors M. Irené Ferrer and Réjane M. Harvey have continued their investigations of the effects of drugs upon the circulation, in rest and exercise.

Professors John H. McClement, Julia M. Jones, Marvin Kuschner, and Anne M. Briscoe have continued the clinical and biochemical study of resected tuberculous lesions. An extension of the application of biochemical techniques to the study of healthy and diseased lungs has recently been made. Analyses of lungs for their elastic tissue content using chemical techniques have been started. A satisfactory chemical method for measuring elastic tissue content of lungs is being developed.

Professor Jones and Dr. Jean F. Huddleston have carried out a study of the problem of tuberculosis among contacts with tuberculous patients under chemotherapeutic treatment.

Drs. Charles A. Werner and Evelyn Grobow of the Second Division, Professor McClement, and Dr. Davis are continuing to study the role of bacterial infections in emphysematous patients.

The long-term study of pleural, pericardial, peritoneal, Fallopian-tube, and lymph-node tuberculosis under chemotherapy is being continued by Professor Jones and Dr. Robert R. Henderson. At the present time, 208 cases of extrapulmonary tuberculosis have been studied and are being maintained in follow-up. Pathologic, clinical, and bacteriologic correlations are being studied in each of these categories.

A clinical and pathologic study of pleural disease is being carried out by Dr. William E. Loring of the Division of Pathology of New York University, and by Dr. Bella Strauss. The pathologic characteristics of pleural tuberculosis under chemotherapeutic treatment are being studied with serial biopsies.

Dr. David G. Simpson and Dr. Jane Walker are observing the various clinical features of para-aminosalicylic acid sensitivity in patients receiving this drug. Clinical studies on the two new antibiotics for the treatment of tuberculosis, streptovaricin and Kanamycin, are being carried out by Professors Jones and McClement. A highly successful symposium on chronic pulmonary disease, sponsored by the First Medical and Chest Services, and the Department of Pathology, was held in April, 1958, with Professor Jethro Gough of Cardiff, Wales, and Professor Averill A. Liebow of Yale, as guest lecturers.

A clinical investigation of the new diuretic agent, chlorothiazide, was carried out by Dr. M. Jay Goodkind and Professors Harvey and Richards.

Drs. Burton A. Lerner and Philip W. Brickner conducted a metabolic study of an interesting case of potassium-losing nephritis.

AT FRANCIS DELAFIELD HOSPITAL

Members of the Medical Service and their associates in biochemistry have broadened the scope of their studies on problems in abnormal growth during the past year. Recognition of the potential place of medicine in the field of cancer research has been slow to develop throughout the country but is now rapidly increasing. This has been largely due to the national emphasis given to cancer chemotherapy.

Professor Elliott Osserman has expanded his study of multiple myeloma to include an experimental plasmacytoma in mice as well as the human disease. In collaboration with Professor Margaret R. Murray of the Department of Surgery and Professor Beatrice C. Seegal of the Department of Microbiology, the experimental tumor has been grown in tissue culture. In the past Professor Osserman has called attention to the hypo-normal-gamma globulinemia in patients with multiple myeloma. With Miss Dolores P. Lawlor, Professor Osserman has detected and studied a histone present in the urine of two patients with sarcoidosis.

Professor Philip Feigelson of the Department of Biochemistry and Dr. John E. Ultmann have continued investigations of the mechanism of action of chemotherapeutic agents. Among them, the purine antagonists have been of interest. With Mrs. Muriel Feigelson, Professor Feigelson demonstrated that there is utilization of ribonucleic acid (RNA) associated with adaptive enzyme formation. This important cellular phenomenon was studied in rat liver by injecting tryptophan which led to a tenfold increase in tryptophan peroxidase. Dr. Ultmann has investigated the fate of erythrocytes in patients with neoplastic disease who have had anemia secondary to an increased rate of red cell destruction.

Dr. George A. Hyman and Dr. Ultmann have conducted ferrokinetic studies in patients with polycythemia vera.

Dr. Heinemann, with Drs. Cemil Emirgil and Jan P. Mijnsen, has initiated a valuable study on pulmonary gas exchange in patients with lymphangitic metastases and in those receiving large doses of radiation to the pulmonary parenchyma for treatment of carcinoma of the breast using carbon monoxide and oxygen to measure diffusion. Dr. Heinemann has also investigated the free water excretion in patients with diabetes insipidus under various water and solute loads. Dr. Heinemann has also studied a number of patients with portal cirrhosis, low total CO_2 content, normal whole blood pH, hyperventilation, and O_2 unsaturation.

Professor Marks, with Dr. Anne B. Johnson and Professor Erich Hirschberg, has made a number of fundamental contributions to the understanding of erythrocyte physiology. He has developed a method for the separation of old and young red blood cells based on the differential in osmotic susceptibility of the cells to saline solutions. Professor Marks and Professor Ruth Gross of the Department of Pediatrics at Stanford University School of Medicine defined a hereditary defect in glucose-6-phosphate dehydrogenase in erythrocytes.

Dr. Alexander S. Edwards has served as the professional assistant of the Subcommittee on Steroids in Cancer of the American Medical Association. He has analyzed over 900 records of women with disseminated carcinoma of the breast who have received sex hormone therapy and have been followed for periods of from three to eleven years.

Professors Hirschberg and Gellhorn have continued investigations of screening methods in cancer chemotherapy as well as structure activity relationships in the drug treatment of experimental tumors. They, and Dr. Enrico Anglesio of Turin, Italy, completed an evaluation of bone marrow function and intestinal epithelial proliferation as possible systems for anti-tumor drug screening. With Professor Lewis P. Rowland of the Department of Neurology, Professor Hirschberg has also been studying serum enzymes in muscle diseases.

Dr. Paul E. Hochstein of the Department of Biochemistry has studied glycolysis in homogenates of normal and neoplastic tissues.

Dr. Hartwell G. Thompson, Jr., of the Department of Neurology has organized an electroencephalographic laboratory. Because of the frequency of brain metastases from carcinomas of the lung and breast, electroencephalograms are being done routinely in these patients as a part of their preoperative evaluation.

Professors Gellhorn and Hirschberg and Dr. Thompson have been studying phosphohexose isomerase in the spinal fluid of patients with primary and secondary brain tumors. Professor Gellhorn, together with Professors Seegal and Osserman and Dr. Hyman, has investigated the erythrocytes of patients with cancer for incomplete antibodies.

During the past year the Medical Service has conducted clinical evalua-

tions of benzimidazole nitrogen mustard and 5-fluorouracil in a variety of neoplastic diseases. No significant advantages or true benefits were achieved with these compounds. Research of the group indicates concentration on mechanisms of disturbances in the physiology of the human tumor-bearing host and on fundamental cellular biochemistry.

AT GOLDWATER MEMORIAL HOSPITAL

On January 15, 1958, the Columbia University Research Service at the Goldwater Memorial Hospital assumed responsibility for the medical care of ninety of the four hundred custodial patients admitted to the newly instituted Public Home Infirmary of the Hospital. This Infirmary (under New York City's Homestead plan) has been developed through the combined auspices of the Departments of Hospitals and Welfare and the New York State Department of Social Welfare. It is expected that this added responsibility of the University will not interfere with the purposes and goals for which the Research Service was inaugurated twenty-two years ago: furthering investigation and education in the field of long-term diseases.

Fourth-year students continue to serve as clinical clerks in residence. Patients in the entire hospital are available for the eight sessions in the course on physical diagnosis conducted by Professor Kneeland.

Professors Kendall and Abell have studied the influence of diet and hormonal imbalance upon the serum cholesterol levels and serum lipoprotein patterns of dogs.

Professor Wertheim, in collaboration with Professors Kendall and Abell, is investigating some factors which influence dietary fat absorption and transport in man and the dog. The lipid electrophoretic patterns of dogs on dietary high fat, thiouracil or cholesterol regimens and various combinations of these are being studied. The effect of oral nicotinic acid on dogs fed thiouracil and cholesterol is being investigated.

Dr. Rudman has developed a simplified method for determining serum total dihydroxy and trihydroxy bile acids. The sera of fifty patients with hepatic disease have been analyzed. The serum bile acid patterns characteristic of patients with portal cirrhosis, acute hepatitis, and obstructive jaundice are being delineated.

Professor Steiner, Dr. Aristides G. Varsos, and Dr. Paul Samuel report that although a diet rich in saturated fatty acids produces a threefold increase in the serum cholesterol concentration of the rabbit, a diet containing a comparable amount of unsaturated fatty acids fails to alter significantly the control level of this serum lipid. Professor Steiner and Dr. Samuel are continuing their studies of the effect of various diets, low in fat or rich in saturated or unsaturated fatty acids, on the serum cholesterol level of patients with coronary atherosclerosis.

Drs. Henry Lax and Arthur W. Feinberg have continued their investiga-

tion of arterial pulse waves as recorded periarterially. During the past year a portable and inexpensive machine has been designed to detect the arterial pulse wave.

Professor Erwin H. Mosbach has continued his investigation of the dihydrocholesterol-induced cholecystitis and cholelithiasis in the rabbit in collaboration with Professor Margaret Bevans, now at the New York Infirmary. Professors Mosbach and Bevans are studying the changes in the composition of the bile and of the gallstones during the development of the experimental cholecystitis and cholelithiasis.

Professor Deming and Drs. Marion E. Hodes, Aida Baltazar, Juan G. Edreira, and Seta Torosdag have been studying the concentration of cholesterol in the serum of patients with hypertension. With Professor Mosbach, Professor Bevans, Dr. Marie M. Daly, and Professor Abell, Professor Deming reports that induced hypertension is associated with an increase in the serum and tissue cholesterol content and the degree of atherosclerosis in rats on an atherogenic diet. He and his associates are continuing a clinical evaluation of the effects of antihypertensive agents in patients with hypertensive cardiovascular disease.

Drs. Daly and Esmeralda Gurpide have studied the oxidative metabolism of aorta. Dr. Daly is conducting a comparative study of the synthesis of fatty acids and cholesterol by aortas of normotensive and hypertensive rats and an investigation of the effects of epinephrine and of nor-epinephrine on isolated rat aorta. Professor Milton Mendlowitz, working largely at the Mount Sinai Hospital, has been investigating the effects of nor-epinephrine in patients with primary hypertension or Cushing's syndrome. Investigation of metabolites and enzymes concerned in nor-epinephrine degradation is now being pursued.

Professor Arthur J. Patek, Jr., Dr. Saul Cohen, Dr. Ernest Schmatolla, and Professor Bevans have studied the fatty and fibrotic changes produced in the livers of rats by means of a low protein diet. With Dr. Arthur Sakamoto and Mrs. Nancy M. deFritsch, Professor Patek is studying possible constitutional factors in the susceptibility of rats to dietary cirrhosis.

Professor Bickerman and Miss Sylvia E. Itkin are continuing their studies on the antitussive properties of a number of narcotic and non-narcotic synthetic compounds. Cough suppression is evaluated by means of an experimental technique based on the response of normal subjects and patients with chronic pulmonary disease to inhaled citric acid aerosols.

Ventilatory function studies, including pneumotachygraphic tracings of the cough response, are being employed to assess the bronchodilator effect of new oral and aerosol compounds in patients with bronchial asthma. With Professor Barach, modifications of a technique for obtaining bronchial secretions by the use of warm hypertonic saline aerosols are being tested. In addition to serving as a screening procedure for the cytologic diagnosis of bronchogenic carcinoma and the bacteriologic diagnosis of certain pulmonary diseases, the therapeutic value of these aerosols as an aid in facilitating bronchial drainage is being explored.

Microbiology

EXECUTIVE OFFICER: Professor Harry M. Rose

The department regrets the departure of Professor Dan H. Moore, who resigned on December 31, 1957, to join the staff of the Rockefeller Institute for Medical Research. While Professor Moore was a member of the University faculty he made important contributions concerning the physico-chemical properties of serum proteins and their behavior in shock, the nature and etiologic role of the milk-factor agent in mammary carcinoma of mice, and the electron-microscopic characteristics of viruses. Dr. Margaret Holden, associate in microbiology, reached retirement age and was appointed special lecturer for the coming year. Dr. Holden has played an important part in the teaching program for both nurses and medical students, and has done significant investigative work on the development of viruses in cell cultures and the effect thereon of steroid hormones. Dr. Gabriel C. Godman, assistant professor of orthopedic surgery, has transferred his affiliation to the department and has been appointed associate professor. Assistant Professors Calderon Howe and Councilman Morgan were each promoted to associate professor. Dr. Peter Breitenfeld was appointed associate.

The department was honored by visits from Professor Marcel Raynaud, Institut Pasteur (Garches), and Dr. W. R. Sobey, University of Sydney (New South Wales), who gave seminars. A number of outside lectures were given, including a series by Professors Howe, Elvin A. Kabat, and Harry M. Rose in the course on microbiology for second-year students at Seton Hall College of Medicine. Professor Kabat spoke at the International Neurological Congress, Brussels, and gave talks in Germany, Holland, and Switzerland. Professor Beatrice C. Seegal presented a paper at the International Symposium on Mechanisms of Hypersensitivity, held in Detroit under the auspices of the Henry Ford Hospital. Professor Morgan participated in the Fourth International Poliomyelitis Conference, Geneva. Professor Rose contributed to panel discussions at the annual meetings of the American Academy of Pediatrics and the Medical Society of the State of New York.

Professor Howe was elected secretary of the American Association of Immunologists. Professor Rose was elected chairman of the Section on Microbiology, New York Academy of Medicine; he also became a member of the Bacteriology Test Committee, National Board of Medical Examiners.

Seven graduate students were in residence of whom two completed all requirements before defense of the dissertation. Mr. Peter Z. Allen, a gradu-

ate student working with Professor Kabat as preceptor, was awarded a National Research Fellowship in the Medical Sciences under which he will continue his studies in England at the Lister Institute. The program of graduate instruction was enlivened by a series of unusually good student seminars on the subject of microbial genetics. As part of this program Professor Stuart W. Tanenbaum again presented his lecture course in microbial physiology, which is offered every second year to students in departments of the Faculty of Pure Science. Professor Tanenbaum, Professor Sam M. Beiser, and Dr. Solon A. Ellison prepared a new lecture course on general microbiology, to be offered in the School of General Studies. Miss Ellyn P. Jones, a third-year medical student, spent her elective period with Dr. Holden and isolated a new strain of herpes simplex virus.

Professor Rose, in collaboration with Dr. Alice W. Knox, continued field studies at Fort Dix, under the Commission on Influenza, Armed Forces Epidemiological Board, concerning the epidemiology and prevention of influenza and adenovirus infections of the respiratory tract. In collaboration with Professors Howe and Morgan and Dr. Breitenfeld, work was started on the attempted isolation of infective nucleic acids from adenoviruses.

Professor Claus W. Jungeblut continued his investigation on the growth requirements of certain neurotropic viruses in various tissue culture media. In association with Dr. Helen Kodza, a study was carried out of the inhibitory action of receptor-destroying enzyme on the cytopathogenic growth of EMC virus on HeLa and L cells.

Professor Kabat carried forward his work in the immunological laboratories at the Neurological Institute under the Departments of Microbiology and Neurology.

Professor Seegal, in association with Dr. Konrad Hsu, studied the localization of specific organ antisera in tissues of the rat, dog and rabbit. The same technique was applied to a study of the extravascular distribution of serum proteins in man, in association with Professor Forrest E. Kendall, at the Goldwater Memorial Hospital, and Professor Herbert Kayden of New York University. In association with Professor Sidney C. Werner of the Department of Medicine, a study of specific antihormones was undertaken.

Professor Howe continued his investigation of the influenza hemagglutinin receptor substance in human erythrocytes. In collaboration with Professor Kabat and Dr. Gerald Schiffman, the investigation of enzymes of *Cl tertium* and their action on purified blood group substances of human and animal origin and on pneumococcal polysaccharide (type XIV) was extended. Studies of a species of *Saccharobacterium* with blood group-splitting activity were completed, in association with Mr. Thomas E. Gilmore. In collaboration with Professors Godman, Morgan, and Rose, histochemical and electron-microscopic studies of adenoviruses in tissue culture were continued, with particular reference to type 5. In addition, in collaboration with Dr. Breitenfeld, large scale cultivation of adenoviruses was initiated in order to derive sufficient viral material for chemical analysis.

Professor Bernard F. Erlanger extended his work on the synthesis of decapeptide analogues of gramicidin S. The synthesis of three analogues was completed and these compounds are being examined for their antibacterial properties. In addition, studies were initiated to utilize insoluble substrates as chromatographic media for the purification of enzymes. In collaboration with Professor Beiser, Professor Seymour Lieberman of the Department of Obstetrics and Gynecology, and Professor Frederick J. Agate of the Department of Anatomy, an investigation of the chemical, immunochemical, and endocrinological properties of steroid-protein conjugates was continued.

Professor Morgan carried on electron-microscopic examinations of thin sections through tissue cultures infected with adenoviruses. With Professor Godman, a detailed study was undertaken to characterize their structure by electron-microscopy, chemical composition by histochemistry, and mode of development by correlation of both techniques. A recently isolated strain of herpes simplex virus was studied and investigations along lines similar to those described above have been started. Asian strains of influenza virus were examined and compared to other strains to determine whether they exhibit any structural differences.

Professor Beiser investigated the chemical, immunochemical, and biological properties of steroid hormone-protein conjugates, in collaboration with Professors Agate, Erlanger and Lieberman. Studies on the fractionation of pneumococcal transforming deoxyribonucleic acid (DNA) by ion-exchange chromatography were carried out in collaboration with Dr. Aaron Bendich of the Sloan-Kettering Institute. In collaboration with Dr. Ellison, evidence for heterogeneity of the DNA effecting streptomycin resistance was also obtained by studying the inactivation of this transforming activity by ultraviolet light.

Professor Tanenbaum enlarged his studies on the biosynthetic pathways leading to patulin formation in *Penicillia*, and began experiments on the biogenetic relationship between the aromatic tropolone ring system of stipitatic acid and the benzenoid nucleus contained in the amino acids phenylalanine and tryptosine of *P. stipitatum*. These projects were carried out with Dr. Emmett Bassett. In collaboration with Professor Beiser and Mr. Michael Mage, a third-year dental student, he also began a study of the specificity of antibody response and cross-reactivity toward synthetic protein antigens containing aromatic haptenic groupings. With Professor Beiser, experiments were begun to study the relationship between protein formation as measured by bacteriophage production versus protein formation involved in induced enzyme synthesis among several strains of *Pseudomonas*.

Dr. Ellison began studies of the composition of human saliva. In collaboration with Professor Irwin D. Mandel of the Department of Dental and Oral Surgery, studies are in progress of the composition of saliva as determined by paper electrophoresis. Dr. Paul A. Mashimo of the Department of Dental and Oral Surgery, continued his research on proteolytic oral bacteria, two strains of which were studied intensively. Dr. Mashimo also investigated

methods for the isolation of anaerobic vibrios from the mouth. Investigation of the inactivation by ultraviolet radiation of strains of pneumococcus and *H. influenzae*, and of DNA derived from them possessing transforming activity, was continued in collaboration with Professor Beiser.

Dr. Holden continued to investigate the effect of adrenocortical steroids on cells *in vitro*. The action of the cortisone acetate and hydrocortisone on growth of L strain mouse fibroblasts, utilizing cell counts as well as histologic methods, was completed. Further observations of the action of hydrocortisone on the capacity of fibroblasts to support the growth of vaccinia virus were made. In association with Professor Seegal, fluorescent antibody technique was used to visualize the presence of virus in cells. Monkey kidney tissue cultures were used in adsorption-hemagglutination tests for detection of influenza virus.

The laboratories of the diagnostic service performed a total of 64,028 examinations, of which 44 per cent were serologic, the majority of these being standard tests for syphilis. Tests of microorganisms for their sensitivity to antibiotics showed another large increase, and such tests were performed on 6,731 strains. Bacteriophage typing of staphylococci was added to the diagnostic procedures and is finding an increasing application as an important method in determining the epidemiology of staphylococcal infections.

Neurological Surgery

EXECUTIVE OFFICER: Professor J. Lawrence Pool

Teaching activities during the past year have continued much as in the past, with the addition of a monthly evening seminar on the research work being carried out by the department. Each teaching session for the fourth-year class includes discussion of such subjects as neuropathology and neuroradiology related to the topic of the day. A well-integrated survey of the clinical, diagnostic, pathological, and therapeutic approaches to major neurosurgical problems is thus provided, and illustrated by presentation of patients before and after surgery.

Neurosurgical teaching for the nursing staff has been considerable during the year, while five clinical lectures have been given before the first-year class in neuroanatomy. In addition to this, daily teaching is carried out with the neurosurgical resident staff on the wards and in the operating rooms, as well as during regular weekly conferences and special rounds. There are also combined conferences with the Department of Neurology and frequent sessions on neuropathology for case reviews. Various members of the attending

and resident staffs participate from time to time in conferences held by other departments, and we are grateful to representatives of these departments who have participated in neurosurgical conferences. While there is constant attention to teaching at all levels, improvements in the teaching of our residents is being planned with their suggestions and cooperation.

Clinical as well as laboratory research in the department has been steadily increasing during the past few years. Clinical and x-ray studies on vasospasm of the larger arteries of the brain have been carried out. Continued study of the treatment of ruptured intracranial aneurysms suggests that early intracranial surgery is advisable before cerebral vasospasm leads to permanent brain damage or fatal cerebral edema. Early operation also removes the risk of recurrent fatal hemorrhage.

Our clinical studies also include an evaluation of facial and tongue function following successful anastomosis of the hypoglossal to the facial nerve in the relatively few patients in whom facial nerve palsy has followed acoustic nerve tumor removals. Twelve such cases are being studied by Dr. Laibe A. Kessler, Professor Pool, and Professor Joseph Moldaver of the Department of Neurology.

A cooperative study of glioblastoma tumors of the brain is being initiated. Dr. Hartwell G. Thompson of the Department of Neurology is directing this survey in close cooperation with Professor Juan M. Taveras of the Department of Radiology, Professor Alfred Gellhorn of the Department of Medicine, and members of the neurological and neurosurgical staffs. A tumor registry and improved follow-up system have already been instituted.

Professor Pool presented papers covering his research projects at numerous meetings during the year, including the New York State Division of the American Psychiatric Association, the American Academy of Compensation Medicine, the Veterans Administration, the International Congress of Neurological Sciences in Brussels, the Society of Neurological Surgeons, and the Harvey Cushing Society. He also inspected new neuro-psychiatric units at Bordeaux, France, and Edinburgh, Scotland.

Professor Fritz Cramer has directed a study of abnormal intradural calcification and ossification with the assistance of Dr. James W. Correll and presented this material at the International Congress of Neurological Sciences in Brussels.

Professor Lester A. Mount has continued his investigation of the collateral circulation of the brain and the treatment of intracranial aneurysms by carotid ligation in the neck. He is also carrying on his survey of the operative treatment of premature synostosis of the sutures of the cranial wall. Professor Mount spoke at the Neurosurgical Society of America, the Mexican Society of Neurology and Psychiatry, and the Albert Einstein College of Medicine.

Clinical research is being pursued by Professor Edward B. Schlesinger on brain tumors and other lesions of the brain by means of radioactive uptake. Professor Schlesinger has reported his studies at meetings of the First Ameri-

can Congress on Legal Medicine and Law-Science Problems, and the Regional Committee on Trauma of the American College of Surgeons.

Professor Joseph Ransohoff has carried out a study of spinal cord tumors in children with Dr. Harold Haft (now at the Veterans Administration Hospital) and Professor Sidney Carter of the Department of Neurology. In addition, he has investigated the treatment of hydrocephalus by ventriculopleural shunts and the physiology of cerebrospinal fluid circulation, with Professor Robert A. Fishman of the Department of Neurology. His study of hemispherectomy and other major cortical procedures for the treatment of uncontrollable convulsive seizures has been carried out in collaboration with Professors Sidney Carter, Melvin D. Yahr, and Eli S. Goldensohn of the Department of Neurology. Investigation of the mechanisms involved in the experimental production of rage states in animals and modification of these states by lesions in the temporal lobe are being carried out with Dr. Murray Glusman at the New York State Psychiatric Institute, and a study of acute intraventricular hemorrhage in premature children is being pursued by serial hematocrit studies with Professor William A. Silverman of the Department of Pediatrics. With the assistance of Dr. Edgar M. Housepian, he also prepared an exhibit on his technique of ventriculopleural shunt for the treatment of hydrocephalus which was presented at the Congress of Neurological Surgeons and the Academy of Neurology.

Professor Thomas J. Bridges has continued his study with the use of the plethysmograph of cerebral vasomotor phenomena and a study of digital vasomotor responses to nerve root stimulation in the treatment of advanced Raynaud's disease. Further investigative studies included the effect of hypophysectomy on prostatic and breast carcinoma, an analysis of cordotomy cases, with Dr. Jules C. Ladenheim at Francis Delafield Hospital, a review of seventy cases of cordotomy with Dr. Byron Stookey, and an analysis of thirty-three laminectomies for cord compression due to cancer. He participated in a symposium on cerebrovascular disease given by the section of neurology at the New York Academy of Medicine.

Work in our two neurosurgical laboratories has been so active that a regular operating schedule is required. In the laboratory under the direction of Professor James B. Campbell, a special small-animal operating room has been constructed to provide aseptic conditions for work on nerve and spinal cord regeneration with the use of Millipore. Experience in the construction and use of this room may well be applied to modification of clinical operating rooms. Professor Campbell also continues his development of apparatus for the stereotaxic intracranial placement of radioactive isotopes for the alleviation of dyskinesias.

Papers were read throughout the year at meetings which included the physiology seminar of Cornell University Medical School, postgraduate seminar at Yale University, the Inter-American Symposium on the Peaceful Application of Nuclear Energy at Yeshiva University, the National Institute

of Health, the International Congress of Neuropathology at Brussels, the American Physiological Society, and the American College of Surgeons.

In the Paul Moore Neurosurgical Laboratory shared by Professor Dominick P. Purpura, Dr. James W. Correll, Dr. Hubert L. Rosomoff, Professor Pool, Dr. Sherwood A. Jacobson, Dr. Thomas M. Fletcher, and others, several lines of investigation are in progress. One is the study of intricate functions of the grey matter of the cerebral cortex of the cat by Professor Purpura and his group. Other studies include an analysis of synaptic activity in the cerebral and cerebellar cortex with particular emphasis on the role of inhibitory processes in the cerebral cortex; analysis of caudate-cortical projections in the cat; central synaptic action of amino acids and their application to problems of synaptic organization; electrophysiological and pharmacological studies of apical dendritic activity; effects of hypothermia on centrally induced cardiac irregularities; and systemic actions of amino acids in cortical regions of blood-brain barrier loss.

As in previous years, collaboration with Professor Harry Grundfest of the Department of Neurology continued to be an important feature of the research activity of the laboratory. In addition, the laboratory has served to train research fellows in neurophysiology; this group includes Dr. Martin Girado from Buenos Aires, Dr. Juan Gómez from Colombia, Mr. Thomas Smith, a third-year medical student who is serving as a predoctoral fellow in neurophysiology, and Mr. Desmond Callan, a second-year medical student. Their major study concerned effects of intraventricularly administered amino acids on electrocortical activity.

Dr. James W. Correll, with Dr. Charles Simpson, has continued his study of lipid changes in the rabbit as influenced by the central nervous system. This involves careful quantitative measurements with special techniques and is aimed ultimately at a study of mechanisms and treatment of peripheral neuritis. Cerebral vasospasm has been studied by Drs. Sherwood A. Jacobson and Thomas M. Fletcher.

Dr. Henry R. Liss has participated in a combat head injury project with Professor William F. Caveness of the Department of Neurology. Also associated with this project is the implantation of permanent electrodes into the skull and reticular formation of monkeys for simultaneous electroencephalographic recording during and following cerebral concussions. With Professor Fred Mettler of the Department of Neurology, Dr. Liss is continuing his study on surgical trauma of the spinal cord, and with Professor Mettler and Mr. Waller V. Morgan of the Department of Neurology, he is creating electrolytic lesions of the spinal cord and attempting to create minimum spread of damage by the use of ultra high-frequency current.

Dr. Hubert L. Rosomoff with the assistance of Dr. Kenneth Shulman has pursued the study of artificially induced brain injury in dogs and the protective effect of hypothermia.

Dr. John Potanos, on leave of absence for this year, has been actively en-

gaged in biochemical research with Professor Samuel Graff and his staff at the Francis Delafield Hospital, studying certain aspects of the Krebs cycle pertaining to brain metabolism.

The study of dyskinesias such as dystonia and the tremor and rigidity of Parkinson's disease is being continued by pallidal surgery. Dr. Edgar M. Housepian has been most active in improving this technique.

During the year fifty-two distinguished visitors were entertained in the department, the majority being well-known neurosurgeons from European countries, South America, Australia, Formosa, and Japan. In addition, the Neurosurgical Travel Club consisting of members of clinics throughout this country, spent two days at the Neurological Institute to observe surgical techniques and attend presentation of papers by members of the department.

Neurology

EXECUTIVE OFFICER: Professor H. Houston Merritt

The teaching activities of the department continued at their previous high level. In addition to the regular courses in neurology for the medical students, the department directed the training of fifteen resident physicians of the hospital and eleven fellows assigned by the United States Public Health Service and other agencies. The past year was the first complete year for the training program in child neurology. This program, under Professor Sidney Carter, centers its activities in the Babies Hospital and Vanderbilt Clinic of the Presbyterian Hospital. With the cooperation of Professor Rustin McIntosh of the Department of Pediatrics, we have had the opportunity of increasing the amount of instruction in child neurology to the students in pediatrics. We were fortunate in being able to obtain Dr. James M. Hammill, formerly chief of neurology at the Walter Reed Hospital of the United States Army, as assistant professor of neurology, to assist Professor Carter with this program.

The research activities of the department continue to expand although there has been no increase in facilities. The greatest need of this department is laboratory space for research. Although financial assistance could be obtained for their work, it has not been possible to retain young physicians interested in research in neurological disease.

During the year 1957-1958, Dr. Juan Gómez, in association with Dr. Robert Thompson of the Department of Psychology, has worked with Professor Fred A. Mettler in the study of the functions of the striatum. Professor Mettler's program in the study of striatal function has also yielded informa-

tion with regard to the relationship of this tissue to acquisition and retention of learned patterns of behavior. Dr. Thompson has found that the extent of loss of learned behavior is proportional to the amount of tissue destroyed.

During the early summer Professor Mettler was a participant at the meetings of the Irish Medical Association in Cork and served as MacArthur Lecturer at the University of Edinburgh Medical School. He subsequently delivered an address before the First International Congress of the Neurological Sciences at Brussels. The publications of Professor Mettler during the year included a study of the effect of vestibular system damage on cerebral ataxia. During the year Professor Mettler was elected a member of Société Française de Neurologie and a fellow of the International Academy of Zoology (Agra, India.) He was appointed to the National Advisory Committee of the Law and Medicine Institute and served as consultant for the development of the microclimate capsule, otherwise known as the animal or biologic satellite.

The neurochemistry section of the department, under the direction of Professor David Nachmansohn, continued its research activities on various chemical processes in relation to nerve activity.

One of the outstanding achievements of the last few years was the development by Professor Irwin B. Wilson of a potent antidote against "nerve gases," the most powerful chemical warfare agents ever developed. These organophosphorous compounds are also widely used as insecticides in agriculture. Their action is on the cholinesterase system causing paralysis of nerve conduction and death. An antidote (pyridine aldoxime methiodide—PAM), which fits the theoretical requirements exactly, was designed by Professor Wilson and synthesized by Dr. Sara Ginsburg. It was tested in animals and proved to be a powerful and efficient antidote. PAM gives 100 per cent protection to dogs against twenty-fold lethal doses of sarin, the fastest acting nerve gas. It has been used against insecticide poisoning in man in Japan where thousands of casualties occur each year. This is the first time that a molecule has been designed theoretically in complementary conformation to a protein with a precision down to fractions of 1 \AA° and acting exactly according to theory not only in vitro but in animals.

Professor Wilson and Dr. Ernest Schoffeniels tested the lipid soluble quaternary ammonium ions on various preparations such as crab and lobster axons and electrophax of electric eels. When Professor Wilson and Dr. Schoffeniels, with the help of Dr. Ladislav Hinterbuchner, applied these compounds to striated muscle, they obtained reversible contractions even after complete block of the synapse by curarization. It has been demonstrated by a slight modification of the acetylcholine molecule that acetylcholine is responsible for the elementary process in the conduction of nerve impulses. The theory proposed fifteen years ago by Professor Nachmansohn has found a striking confirmation.

The electric organ of *Electrophorus electricus*, which has been used by Professor Nachmansohn for twenty years in his studies, offers apparently

inexhaustible possibilities for obtaining a better understanding of the chemical basis for the generation of bioelectric currents.

Dr. Schoffeniels, joined recently by Dr. Wolf Dettbarn, studied ion flux across conducting and nonconducting membranes of an isolated electroplax and the chemical and physical factors affecting the flux. Dr. Frank Hoskin is studying special aspects of the intermediary metabolism of the electric organ: the pattern of glycolysis, the citric acid cycle, and amino acid metabolism. Dr. Seymour Ehrenpreis, research associate in biochemistry from Cornell University, joined the group in the fall and is fractionating the proteins of electric tissue. One of the aims is the isolation of the receptor protein for acetylcholine. Dr. Claire Lawler has made great advances in methods of purifying cholinesterase from electric tissue. Dr. Annemarie Weber continued her studies on the physicochemistry of muscle proteins with special emphasis of their interaction with Ca ions.

During the last summer Professor Nachmansohn gave a series of lectures in many European universities: Paris, Lyon, Stockholm, Berlin, Munich, Heidelberg, Oxford, Rome, Naples, Zurich, Berne, and Basel. He was honored by the French Biochemical Society which presented him with the Medal of the Society. Professor Nachmansohn's group participated in the teaching program of biochemistry for medical students. For the next year a special postdoctoral training program in neurochemistry is being organized. This program will be subsidized by the United States Public Health Service.

The ability of one and the same invertebrate muscle to produce two different kinds of responses, a fast twitch and a slow graded sustained contraction, has long puzzled physiologists. The hypothesis developed by Professor Harry Grundfest—that there are two fundamentally different kinds of electrical activity in electrogenic cells—suggested an explanation of this dual responsiveness. Experiments performed on the muscles of the grasshopper *Romalea microptera* have confirmed this conclusion and have thereby added further evidence for the general theory. This work has been done with Dr. Jean Cerf of the Department of Pathology, Brussels; Dr. Graham Hoyle of the University of Glasgow; and Miss Francis V. McCann of the University of Connecticut.

Intracellular recordings from individual electroplaques is being used by Dr. Michael V. L. Bennett to analyze the rhythmically emitted electrical pulses of the knifefishes, which are relatives of the electric eel.

The Nile catfish has not been studied for nearly fifty years, despite the general recognition that the electric organs of this fish differ in many respects from those of other forms. The analysis of these differences has been carried out with modern electrophysiological techniques with Dr. Bennett and Dr. Richard D. Keynes of Cambridge University, England, who worked for several months in Professor Grundfest's laboratories.

The studies begun last year by Professor Grundfest on the electric organ of the Torpedine, *Narcine brasiliensis*, and the stargazer, *Astroscopus guttatus*, are being continued. A hitherto undescribed accessory organ in *Narcine*

was discovered in the course of the initial work with Mr. Robert Mathewson, curator of science, Staten Island Museum of Arts and Sciences; Mr. Ernest Amatniek, senior engineer-biophysicist, Department of Neurology; and Professor Alexander Mauro, assistant professor of physiology, Yale University. Embryological, histochemical, and electron-microscopic studies are being continued by Mr. Mathewson.

A study by Dr. Bennett and Dr. Stanley M. Crain of Abbott Laboratories was undertaken primarily to examine the nature of the electrical activity of the neurons in the puffer, *Spheroides maculatus*. However, other interesting features, relating to the neurological organization of these cells, were also discovered. Dr. Crain was the recipient of a Grass Foundation Fellowship to pursue this work. Dr. Bennett has received this fellowship for 1958 to continue the study.

Studies on the physiology and pharmacology of the central nervous system are carried on jointly by Professor Grundfest with Professor Dominick P. Purpura of the Department of Neurological Surgery with the collaboration of Drs. Martín Girardo and Juan Gómez. The results of these studies are the development of new tools for testing the synaptic organization of the central nervous system, and of new means for analyzing the nature of the electrogenic structures of cortical synapses.

Professor Grundfest, in collaboration with Professor Purpura, Mr. Thomas G. Smith of the Department of Neurological Surgery, and Drs. Girardo and Gómez, has been able to eliminate the blood-brain barrier in local cortical regions. When injected in very small quantities, the synaptically active amino acids, which normally do not penetrate the barrier, can now exert the same effects that were observed in our previous work with topical applications of the drugs.

The analytical tools provided by the new interpretation of pharmacological effects in the central nervous system of the cat have been used by Professor Grundfest to explore certain strategic regions of the bullfrog spinal cord. This work was done in collaboration with Dr. Ernst Sigg, visiting scientist at the Geigy Research Laboratories.

The digital plethysmographic method which has proved useful for quantitative studies of local dental anesthetics has been applied to evaluation of orally administered analgesics of relatively low potency by Professor Grundfest in collaboration with Professors Joseph E. Fiasconaro and Harold Sherman of the Department of Dental and Oral Surgery.

Professor Grundfest took part in the Fourth Conference of Neurochemistry in Atlantic City, the Symposium on Dendritic Potentials in Santa Fe; Symposium on Electrophysiology of Vision in Bethesda, Maryland; Symposium on Excitation and Inhibition, Washington University, St. Louis; Joint Session on Neurophysiology and Neuropharmacology at the meeting of the American Physiological and Pharmacological Societies, Philadelphia. Professor Grundfest also gave lectures at Vanderbilt University and the Uni-

versity of Chicago, as well as research seminars at Cornell, Illinois, Vanderbilt, and Chicago.

The immunochemical laboratories of Professor Elvin A. Kabat are operated jointly under the Departments of Microbiology and Neurology. The major studies are concerned with the elucidation of the structural units determining blood group A and B specificity, the structural basis of immunochemical specificity of antigens and studies of cerebrospinal fluid globulins in the diseases of the central nervous system.

Mr. Peter Z. Allen, a graduate student in microbiology, and Professor Kabat have completed a study of the duration of the antibody response to dextrans and blood group substances in man and have compared their findings with those reported earlier for the pneumococcal polysaccharides and diphtheria toxoid.

Dr. Frederic C. McDuffie, now assistant professor of medicine at the University of Mississippi Medical School at Jackson, Mississippi, Mr. Peter Z. Allen, Dr. Curtis A. Williams of the Rockefeller Institute for Medical Research, and Professor Kabat, have immunized rabbits with specific precipitates of blood group A and human anti-A and of blood group B substance and human anti-B.

Mr. Joel Goodman, a graduate student in microbiology, and Professor Kabat are studying the cross reactions of various dextrans with Types 2, 9, 12, and 20 antipneumococcal sera in efforts to determine the structures responsible for cross reactivity. Professor Kabat and Miss Ada E. Bezer have studied the capacity of fractions of dextran of differing molecular weight to stimulate antibody production in man.

Professor Calderon Howe and Dr. Gerald Schiffman of the Department of Microbiology, Miss Bezer, and Professor Kabat are engaged in a study of the effects of enzymes from two strains of *Clostridium tertium*.

Dr. Irving Finger has completed a study of the antibodies produced in Schick negative individuals by the administration of small doses of diphtheria toxoid.

Mrs. Amy Kidd and Professor Kabat are continuing the immunochemical determination of gamma globulin in cerebrospinal fluid. With Professor Melvin D. Yahr, a series of patients with multiple sclerosis and Schilder's disease who received large doses of prednisone were studied.

Professor Kabat attended the International Congress of Neurological Sciences in Brussels in July, 1957, and presented a paper. While in Europe he lectured at the Universities of Basel and Freiburg, at the Max Planck Institute for Virus Research in Tubingen, at the Max Planck Institute for Biochemistry in Heidelberg, at the Behringwerke in Marburg, and at the University of Leiden. He served on the Panels on Plasma on Tissue Transplantation of the National Research Council and was appointed to the editorial board of the *Transplantation Bulletin*. He was also appointed a member of the American Institute of Biological Sciences Advisory Committee on Biochemistry to the Office of Naval Research. Professor Kabat was also elected an honorary

member of the Columbia Chapter of Alpha Omega Alpha. Mr. Peter Z. Allen was awarded a National Research Council Postdoctoral Fellowship to work at the Lister Institute in London with Dr. W. J. Whelan in carbohydrate chemistry. Dr. Irving Finger, visiting fellow, accepted a position as assistant professor of biology at Haverford College, Haverford, Pennsylvania.

Professor James M. Hammill, who joined the department as an assistant professor of neurology in July, is working with Professor Melvin D. Yahra in a study of cerebral aneurysms.

During the past year there were five American and four foreign fellows studying pediatric neurology. The Americans were Drs. Isabelle Rapin, Charles Kennedy, Elisabeth Decker, Alanson Hinman, and John Menkes. The last three will continue on for another year. The foreign fellows were Drs. Agnes Bimbi-Kovacs, fellow of the United Cerebral Palsy Association from Canada; Benjamin Wood from England; Gershon Szabo from Israel; and Raden Mas Soejoenoes from Indonesia.

Professor Sidney Carter and Professor Joseph Ransohoff of the Department of Neurological Surgery conducted a two-day seminar on pediatric neurology at the annual meeting of the American Academy of Pediatrics in Chicago. Professor Carter participated in the Symposium on Kernicterus at the meeting of the American Academy for Cerebral Palsy in New Orleans, and in the Postgraduate Seminar on Neurology and Neurosurgery at the University of Kansas School of Medicine. Professor Carter was chairman of the course in pediatric neurology given at the meeting of the American Academy of Neurology in Philadelphia and moderator of a panel on recent advances in pediatric neurology at the spring meeting of the American Academy of Pediatrics in New York. A study of optic neuritis in children by Professor Carter and Drs. Kennedy and Carroll was presented at the annual meeting of the American Academy of Neurology. Professors Carter and Ransohoff continued the evaluation of the effect of chemopallidectomy on involuntary movements in children. Professor Carter served as a member of the Neurology Graduate Training Grant Committee of the United States Public Health Service and of the *ad hoc* committee to review applications for participating in their collaborative project on cerebral palsy. He is also chairman of the Professional Advisory Council of the Cerebral Palsy Association of New York City.

Professor Daniel Sciarra has continued studies on new anticonvulsant drugs. Professor Sciarra and Professor Stuart Cosgriff of the Department of Medicine are conducting a study of the use of anticoagulants in patients with cerebral thrombosis or embolism.

Professor Paul F. A. Hoefer discussed electromyography at the International Congress of Neurological Sciences in Brussels in July, 1957.

Professors Eli Goldensohn and Hoefer reported briefly on electroencephalographic findings during status epilepticus and in interseizure records, at the annual meeting of the American League Against Epilepsy. In April, 1958, Professor Hoefer gave a lecture before the joint meeting of the New

York Academy of Medicine and the New York Neurological Society. He was elected to honorary membership in the Sociedad Sudamericana de Electroencefalografia y Neurofisiologia Clínica.

Professor Goldensohn and Dr. Robert Katzman of Albert Einstein Medical College have continued their studies on the distribution of direct current potentials in the brain. Professor Goldensohn and Mr. Leonard Zablow are making further studies on an electrical impedance method for recording respiration. Professor Goldensohn and Dr. William Hass have continued their investigation on the electroencephalographic changes associated with thrombosis of the internal carotid artery. Professor Goldensohn, Dr. Hass, and Drs. Elliott Weitzman and Robert Engisch of the resident staff, are investigating body tilting and carotid compression as methods for activating electroencephalographic abnormalities in cerebral vascular insufficiencies. Professor Goldensohn, Dr. Isabelle Rapin, and Professor Hoefer have continued their study on the relationship between electroencephalographic changes during hyperventilation and levels of carbon dioxide measured throughout the respiratory cycle in various age groups.

Professor Melvin D. Yahr, with Mr. Harry Dougherty, graduate student in the Department of Biochemistry, are studying the blood levels of anti-convulsant drugs in order to determine more accurately therapeutic and toxic levels of these drugs in patients with convulsive seizures. Professor Yahr, with Professor Ransohoff and Dr. Roger Duvoisin of the resident staff, is studying the effect of Dilantin on trigeminal neuralgia, and with Professor Leonard J. Goldwater of the School of Public Health and Administrative Medicine he is evaluating the work performance of epileptic patients in industry. Professor Yahr has also been studying the effect of chlorothiazide (Diuril) on patients with increased intracranial pressure. Professor Yahr has been active in the study of the cerebral aneurysms and subarachnoid hemorrhage with Professors H. Houston Merritt and Hammill, and members of the Departments of Neurological Surgery, Neurology, Pathology, and Radiology. Since 1957, seventy patients have been studied.

Similar studies are being carried out in other neurological centers throughout the nation. It is hoped, that, with pooling of data from all these centers, a better understanding of this problem and its treatment will be forthcoming.

Professor Yahr presented papers at the American Neurological Association meeting in June, 1957; International Congress of Neurological Sciences at Brussels, Belgium in July, 1957; and at the annual meeting of the Association for Research in Nervous and Mental Disease in December, 1957.

Professor Joseph Moldaver is studying patients with facial nerve paralysis following brain surgery for the removal of acoustic nerve tumors. This work is being done with Professor J. Lawrence Pool of the Department of Neurological Surgery and Dr. Laibe Kessler of the resident staff. Professor Moldaver is also studying the indications for surgery in severe Bell's palsy, with Professor Edmund P. Fowler, Jr. of the Department of Otolaryngology; and the use of nerve graft in facial palsy accompanying malignant tumors

of the neck and face. This work is being done with Professor John J. Conley of the Department of Otolaryngology. Professor Moldaver delivered papers on rhythmic discharges in muscles and the study of evoked reflexes in man, at the International Congress of Neurological Sciences, Brussels, Belgium, and on electromyography of nystagmus in man, at the International Society for Biological Rhythm in Semmering, Austria. Professor Moldaver was guest lecturer at the Medical School, University of Lund, Sweden, in September, 1957.

Professor Lewis P. Rowland is working in the laboratories of Professor David Shemin of the Department of Biochemistry on the biosynthesis and function of carnitine. He has continued work in the myasthenia gravis clinic with Professor Hoefer and Dr. Henry Aranow, Jr., of the Department of Medicine. Studies are under way on the evaluation of therapeutic efficacy of the long-acting anticholinesterase drug and the evaluation of the curare test as a diagnostic adjunct. Members of the myasthenia gravis clinic are also cooperating with Professors Duncan A. Holaday and M. Jack Frumin of the Department of Anesthesiology in the development of a positive pressure respirator for the treatment of patients with respiratory failure. Professor Rowland and Professor Eric Hirschberg of the Department of Medicine are studying the serum enzymes in patients with muscular dystrophy.

The study of the exchange of radiosodium between plasma and cerebrospinal fluid in the dog has been completed by Professor Robert A. Fishman. Professor Fishman, using paper electrophoresis, is continuing the study of the cerebrospinal fluid proteins in various disease states, in collaboration with Professor Elliott F. Osserman of the Department of Medicine.

The striking effects of cortisone on the central nervous system are poorly understood. Experiments are now in progress by Professor Fishman in collaboration with Dr. Nicholas P. Christy of the Department of Medicine, studying the exchange of steroids between plasma and cerebrospinal fluid in the dog.

Dr. Hartwell G. Thompson, Jr., with Professor Alfred Gellhorn of the Department of Medicine and Professor Hirschberg have been measuring the levels of phosphohexose isomerase, lactic dehydrogenase, and transaminase in the cerebrospinal fluids and serum of patients with a variety of malignant tumors and neurological disorders. Dr. Thompson, with Professors Ransohoff, Juan Taveras of the Department of Radiology, Gellhorn, and Hirschberg, has instituted a more intensive study and follow-up of patients with glioblastoma. This study will involve trial of newer anti-tumor drugs, alone and in combination with radiotherapy; the analysis of several components of fresh human glioblastoma tissue and the operation of a tumor registry to follow all patients with glioblastomas.

Dr. Thompson and Professor Taveras are collecting data on the results of treatment in patients with glioblastoma for the past fifteen years.

Dr. Lewis J. Doshay has continued the study of new compounds in the treatment of patients with paralysis agitans. Professor Frederick Agate, Jr.,

of the Department of Anatomy and Dr. Doshay are continuing their work on the construction of instruments for the measuring of muscle tension and abnormal movements. Dr. Doshay gave a paper at the Fifth International Congress of Therapy in Holland on the treatment of Parkinson's disease.

Dr. William Amols has continued work on the clinical evaluation of new drugs in the treatment of disorders of the nervous system. Trilafon (Perphenazine) has been shown to be dramatically effective in the suppression of vertigo in Meniere's disease. Another compound (Smith, Kline & French #5883) has been found to be a potent and effective anti-emetic agent.

Professor William F. Caveness and his associates have continued the study of convulsive disorders and the sequelae of head injury. Professor Caveness, with Dr. Henry R. Liss of the resident staff, completed their study of post-traumatic epilepsy in head injuries incurred in Korea by Navy and Marine personnel. With Dr. Charles W. True of the Department of Pathology the laboratory study of head injury in the Rhesus monkey was continued.

Professor Caveness, in association with Professors Nicholas Kopeloff and Lenore Kopeloff of the Department of Microbiology, Dr. Joseph G. Chusid of St. Vincent's Hospital, Dr. Gertrude van Wagenen of Yale University School of Medicine and William Curlett, has been investigating seizures in Rhesus monkeys.

Professor Caveness, with Epi-Hab, Long Island, Incorporated, helped establish a community workshop on Long Island for the industrial assimilation of epileptics. Professor Caveness presented papers on current findings in convulsive seizures coincident with sleep at the University of Vienna in August and at the American Electroencephalographic Society meeting in October. In collaboration with Captain George N. Raines, M.D., United States Navy, Mrs. Alice S. Peterson of the American National Red Cross, and Dr. Liss, a paper on social and economic adjustment after head injury was presented at the American Neurological Association meeting in June.

Dr. J. P. P. Bradshaw of Leeds, England, spent a year in our department as visiting fellow. He participated in the teaching activities and made a study of the circulation of the spinal cord in animals in an effort to elucidate spinal cord changes in man, secondary to osteoarthritis. Dr. Bradshaw returned to England in November to become the director of the Service of Neurology at the General Infirmary in Sheffield. Dr. Rosa Helena Longo, of São Paulo, Brazil, spent several months in Professor Hoefer's laboratories studying electroencephalography and electromyography.

Research activities of the department at Montefiore Hospital have continued under the direction of Professor Tiffany Lawyer, Jr., who has been interested in the problem of muscular spasticity. Professor Arnold P. Friedman has continued his investigations of vascular factors in the production of headache and his evaluation of various agents for the relief of headache. Dr. Seymour Solomon has continued to evaluate anticonvulsant agents and has been investigating the lowering of cerebral convulsive threshold to photic stimulation in patients with hypocalcemia.

Professor H. Houston Merritt was chairman of the program on multiple sclerosis at the First International Neurological Congress of Science in Brussels in July, 1957. He participated at a symposium on epilepsy at a meeting of the British Medical Association in Newcastle, England. Professor Merritt continues to serve as chairman of the Program Planning Committee of the Council of the National Institute of Neurological Diseases and Blindness of the United States Public Health Service; chairman of the Fellowship Committee of the National Multiple Sclerosis Society; chairman of the Fellowship Committee of the National Foundation for Infantile Paralysis; and chairman of the Medical Professional Advisory Board of the United Cerebral Palsy Association. Professor Merritt acted as visiting professor at the University of North Carolina, Chapel Hill, for a week in April.

Visitors to the department during the past year included Professor C. J. Munch-Petersen, Aarhus, Denmark; Dean T. H. Hunter, University of Virginia; Professor Deolindo Couto, Rio de Janeiro, Brazil; Professor D. Mosovitch, Buenos Aires, Argentina; Dr. Rafael Castillo, Caracas, Venezuela; Dr. Jack Colover, London, England; Dr. Leon Prusale, Poland; Dr. Kozia Matija, Zagreb, Yugoslavia; Professor Sidney Allison, Belfast, Ireland; Professor Robert Aird, University of California; Drs. S. Natradze, D. C. Skoloban, M. Ushakova, M. Pershin, and N. Viazenski of Moscow, Russia; Dr. R. Carrea, Buenos Aires; Professor M. L. Sorel, University of Louvain, Belgium; U. G. Bytseit, Utrecht, Holland; Dr. Frank Elliott, London, England; Dr. H. H. Wiech, Cologne, Germany; Professor A. Vohaconsing, Athens, Greece; and Professor Russell Myers of the University of Iowa.

Nursing

EXECUTIVE OFFICER: Professor Eleanor Lee

The registration figure for September, 1957, of 372 students shows a steady increase in enrollment in the last decade, indicating that more college women are entering our nursing program each year. This fact reflects the trend of increasing enrollments in liberal arts colleges. One hundred and seventeen colleges and universities are represented by the students enrolled at present in the Department of Nursing.

Scholarship aid was given during the year to 111 students or 30 per cent of the students enrolled. The Louise and Gustavus Pfeiffer Foundation provided assistance for fifty students this year. The income from the Vivian B. Allen Foundation was awarded to seven students in the Classes of 1958 and 1960. The income from the Mary Sencindiver Specht Scholarship was

awarded to a member of the Class of 1958. The Greer Scholarship Fund Committee awarded a scholarship to a member of the Class of 1958. This scholarship was made available through the cooperation of Mrs. S. Hazard Gillespie, Jr. The Jane McAllister Scholarship was given to a member of the Class of 1958. The Margaret E. Conrad Scholarship was given to a member of the Class of 1959. New York State Scholarships were given to nine students before entrance. The generous gift from Mr. Frederick Sturges, Jr., was awarded to two members of the Class of 1960. The Dean Sage Scholarship was awarded to a member of the Class of 1960 and the Special Scholarship fund in the department provided fifteen scholarships. The Columbia University Committee for Community Service, Incorporated, has continued their support during the year through the proceeds from the Thrift Shop. The Alumnae Association of Presbyterian Hospital School of Nursing contributed funds which assisted ten students. The Parents Club of Maxwell Hall assisted four students.

The following individuals were appointed as instructors during the year: Janet M. Alley, Virginia N. Bell, Patricia Evans, Lorraine Jacobson, Elizabeth W. Kleinfeld, Margaret Neubrand, Patricia O'Hora, Leahmae Patterson, Mary J. Reynolds, Rosina D. Thomas, Margaret E. Tulevech, and Mary A. Westerman. Miss Elizabeth S. Gill and Miss Rosalie M. Lombard were awarded traineeships for graduate study from the United States Public Health Service in February and each was granted a leave of absence for the spring term. Both received a Master's degree from Teacher's College, Columbia, in June, 1958. Professor Ruth M. Guinter was granted a leave for study to complete her program for the Master's degree from New York University in July, 1958. Mrs. Bertha Unger, instructor in nursing, was granted a leave for study at Teachers College and received a Master's degree in June.

This year the professional aspect of the student program was reduced to thirty-two months which made possible the completion of the course for the Class of 1958 on June 15. In addition, public health nursing field experience was provided for each student. The teaching program has been strengthened through greater emphasis on communicable diseases, mental health, and public health. This year, under two separate grants from the United States Public Health Service, these changes are being carefully worked out under the able leadership of Professor Anne M. McQuade.

The first-year program in medical and surgical nursing was completed the end of May by 131 students. Basic sciences were continued throughout the course and were closely integrated into the content presented through a team approach by members of the faculty of the medical and surgical and allied departments as well as by the instructors in nursing.

The second year is divided into two twenty-four-week periods: maternal and child health which includes twelve weeks each in obstetrics and pediatrics, the other medical and surgical nursing including twelve weeks

in related specialties. A detailed curriculum study of the basic program in maternity nursing is now in progress.

An additional instructor was appointed September 1 to assist with the curriculum study of pediatric nursing. As a result, changes in content and teaching methods have made the nursing care of children more meaningful to the student.

During the second-year program for the class of 1959, the core content was presented in two courses, modern social problems and patient teaching, to four groups of thirty students in a four-week period for each group.

The third-year program for the class of 1958 included psychiatric nursing for twelve weeks, medical and surgical specialties for twelve weeks and eight weeks of senior experience on the general medical and surgical services. In addition to public health field experience of eight weeks, each student was assigned to four weeks in the outpatient department in five clinics selected for teaching. A teaching project in medical group clinic included supervision of student participation in the diabetic class, in home care instruction and in preparation of inter-agency referral forms for patients referred to the visiting nurse.

The multiple planning approach to the mental health curriculum project has been under an advisory committee of representatives of the disciplines of psychiatry, psychology, and nursing within the Faculty of Medicine and of the Faculty of the New York School of Social Work. On the advice of Professor Lawrence C. Kolb, the participation of Professor Robert A. Senescu of the Department of Psychiatry was obtained for this purpose. The cooperation of Professor Senescu and Dr. Robert J. Weiss in planning for and participating in the faculty seminars has been a highlight of this year's experience.

Another research grant was made available to the department on September, 1957, by the United States Public Health Service for the purpose of studying the field practice course in public health nursing as offered in the basic baccalaureate program.

Efforts to introduce the necessary specialized course content in public health and public health nursing continues. Starting with sixteen hours offered to the current third-year class, our plans are moving toward the inclusion of the minimum of sixty hours of theoretical content specified by the National Nursing Accrediting Service. Professors Ray E. Trussell, William C. Spring, Jr., and Margaret W. Barnard have been most helpful in securing the quality of instruction from interested teachers for the course in public health science.

An expert committee advisory to the research project with membership representative of education, research, and service in public health and in nursing, includes administrators of the three public health agencies in which students were placed for the field practice course in public health nursing: Bureau of Public Health Nursing of the Department of Health

of the City of New York, Visiting Nurse Association of Brooklyn, and Visiting Nurse Service of New York. Every member of the Class of 1958 was assigned to public health nursing field practice of one or two months within an eight-week period.

The study of learning experiences in medical-surgical nursing conducted by Professor Dorothy E. Reilly under a grant from the China Medical Board, Incorporated, was published in May, 1958. The title for the study is "The Curriculum through the Eyes of the Student."

The graduate program in maternity nursing offered by the Department of Nursing in cooperation with the School of Public Health and Administrative Medicine, the Obstetrical Service of the Presbyterian Hospital, and the Maternity Center Association has completed a successful year. The second group of students completed the twelve-month program in September and received the Master of Science degree in October, 1957: Miss Norah Cunningham and Miss Rosina Davis Thomas. Miss Ruth Isabella Chaffin returned to Maternity Center Association and upon completion of her research project will receive the Master of Science degree. Two certificates in Training in Maternity Nursing were awarded this year to Marcia Joyce Hughey and Ruth Leona Mickelsen.

In September, 1957, eight graduate nurses were enrolled in the maternity nursing program. Three traineeships from the United States Public Health Service were assigned to the Department of Nursing by Professor Trussell in July, 1957, and awarded to Phyllis Schroeder, Marion Esther Sweatland, and Mrs. Rose Tyndall.

Miss Anna M. Noll of the Maternity Center Association became full-time instructor in nursing, January 1, 1958, to assist Professor Crawford in the teaching program.

A joint meeting of the faculties of the Division of Nursing Education, Teachers College and the Department of Nursing was held at the Men's Faculty Club on December 10. The pre-specialization program of undergraduate study in nursing education was discussed in relation to the division of courses required in general education and professional courses totaling sixty credits.

A total of sixty-five graduate nurses studying at Teachers College have come to the Medical Center this year for field work on a part-time basis in various areas. In addition eight graduate students spent the month of June in a field experience course at the Presbyterian Hospital as an integral part of the program leading to a Master of Arts degree in supervision of nursing in clinical services at Teachers College. Miss Virginia Gill was granted a leave of absence from February through June to conduct a study of supervision at the Presbyterian Hospital under the leadership of Professor Marion D. Cleveland.

The graduation exercises in the garden of the Presbyterian Hospital were held on Thursday, June 5. Mr. Frederick A. O. Schwarz, vice-president of the Board of Trustees of the Presbyterian Hospital, presided. The address

was given by Miss Margaret G. Arnstein, an alumna of the Class of 1928, Chief of the Public Health Nursing Branch, Public Health Service, United States Department of Health, Education and Welfare. Mrs. Frederic de Rham, a member of the Board of Trustees, presented the diplomas, and Miss Helen Young, director emeritus of nursing, presented the pins to the 110 graduates.

Professors Pettit and Crawford were delegates to the meetings of the Council of Member Agencies of the Department of Baccalaureate and Higher Degree Programs, National League for Nursing, held in Chicago in February.

Professor Pettit and Miss Barbara Hanaford attended the annual meeting of directors of Schools of Nursing under the auspices of the New York State Education Department, held in Syracuse in October during the convention of the New York State Nurses Association. Miss Hanaford also attended the Third Annual Mental Health Forum of New York State following the convention. Student representatives to the New York State Student Nurses Association were Misses Joan E. Brown and Patricia Perkins.

Professor Lee was elected a member of the Education Committee of the Visiting Nurse Service of New York. She is chairman of the New York State League for Nursing Committee on Historical Source Materials in Nursing. Professors Lee and Pettit have continued for a second year as members of the University Seminar in the role of the health professions. Professor Ruth M. Guinter was vice-chairman of the Program Committee for the nursing meetings for the American College of Surgeons convention in New York City in March. Professor Harriet M. Deleuran attended a tuberculosis nursing workshop for faculties of schools of nursing, sponsored by the State Education Department and the State Department of Health at Mt. Morris in March.

Professors McQuade and Edith Morgan and Misses Gertrude Clawson and Millicent Tschaepe attended the National League for Nursing, Basic Psychiatric Nursing Education Project, Eastern Regional Conference from March 18 through 20 at Atlantic City.

Misses Margaret Newbrand and Yvonne Trebilcock, instructors in nursing, and Misses Loretta Verdisco, Class of 1958, and Cynthia Bowles, Class of 1960, attended the Eastern States Health Education Conference of the New York Academy of Medicine held in April, 1958. Representatives of the Department of Nursing were Professor McQuade and Miss Estelle M. Guidice. Misses Edith Baldwin, Class of 1958, Gretchen Herling, Class of 1959, and Misses Ardath Fisher, Janet Swanson, Carolyn Swift, and Jane Wichert, Class of 1960, also attended.

The New York Tuberculosis and Health Association annual meeting on April 30 was attended by Misses Lorraine Jacobson, H. Patricia Jones, and Jane A. Travers. The Regional Public Health Conference held in New York City in December was attended by Professor McQuade, Miss Guidice, and Mrs. Cugle.

The basic curriculum committee with Professor Pettit as chairman held monthly meetings during the year. The executive committee with Professor Lee as chairman and Professor Crawford as secretary held regular monthly meetings to act on recommendations regarding policy and to consider special problems.

Obstetrics and Gynecology

EXECUTIVE OFFICER: Professor Howard C. Taylor, Jr.

The tragic death of Professor Earl T. Engle in his sixty-first year on December 12, 1957, has cast a shadow on the entire year in the department. He had the responsibility for the obstetrical and gynecological pathology laboratory, but more particularly he brought his knowledge of basic science principles to the stimulation of research in the fields of clinical endocrinology and fertility. There have been few American scientists who could make this particular contribution and his loss is probably irreparable.

Dr. E. Everett Bunzel, clinical professor of obstetrics and gynecology and a member of the staff since 1922, will retire at the end of the academic term.

Among the new appointments may be noted that of Dr. Emanuel A. Friedman to the position of instructor. For the first few years at least his interests will concern particularly the obstetrical aspects of the cerebral palsy problem.

The clinical appointments in the Margaret Hague Maternity, an important affiliated hospital in Jersey City, were terminated owing to the impending adoption of this institution by the new Seton Hall Medical School as its chief source of obstetrical and gynecological teaching material. The persons involved include four assistant professors of clinical obstetrics and gynecology, Drs. Robert A. Cosgrove, John N. Connell, Joseph P. Donnelly and Edward G. Waters. The end of this long and profitable affiliation with this distinguished institution is much to be regretted.

Among the promotions may be noted those of Drs. Marion Laird, Robert E. Hall, and Harold M. M. Tovell, each from instructor to associate, and of Dr. Equinn W. Munnell from assistant clinical to associate clinical professor of obstetrics and gynecology.

The program for the development of scientifically trained personnel for obstetrics and gynecology has expanded somewhat, although a real problem in finding desirable candidates remains.

Dr. William A. Little, taking a year's leave of absence from his residency,

is studying certain enzymes of the normal and infarcted placenta. Dr. C. Edward Prince, having spent a prior year on work concerned with the physiology of the newborn, is now beginning his clinical training. Dr. Robert A. Munsick has just begun his term as Macy Fellow, working in the Department of Pharmacology on the oxytocic principle of the posterior pituitary. Dr. Raymond Vande Wiele, a visiting fellow (American) has continued work on the biosynthesis of ovarian hormones, studies which will be referred to in more detail below. Dr. Vande Wiele, a graduate of the University of Louvain, has completed all requirements, including the passing of the State Board examinations in New York, and has obtained a full license to practice.

The scholarship program under the Josiah Macy, Jr., Foundation grant has also progressed. A year ago most of the scholarships were awarded to students to work in one of the basic science departments of the medical school on subjects or techniques that promised eventually to have application to the problems of human reproduction. This year a list of research activities, available for students, within the laboratories of the department was prepared with suitable descriptions of the nature of the work. Up to this point five students have been enlisted under the program for the coming year. The program promises to have a revolutionary effect, at least on this department.

Eleven fellows have been associated with the work of the department in the last year. In the endocrine laboratory of Professor Joseph W. Jailer there have been Drs. Julian Kitay, supported by the Commonwealth Fund; Drs. Donald Holub and Leonard Fisher from the National Foundation for Infantile Paralysis; and Drs. Wilfred Gordon and Marvin Belsky, both supported by the National Institutes of Health. Dr. Helena Hughes of Manchester, England, and Dr. Prabhakar N. Shah of Bombay, India, have both completed work supported by the Barnes-Foster fellowship and the Population Council, respectively. Dr. Fumio Doko will continue as a Damon Runyan Cancer Research Fellow, and Dr. Takashi Kobayashi, professor of obstetrics and gynecology at the University of Tokyo, has begun work here under the sponsorship of the Rockefeller Foundation. Dr. Playford Boyle has been assigned to the Francis Delafield Hospital as an American Cancer Society Clinical Fellow. Under a Tucker Fellowship, Dr. Warner Nash has been observing the practice of obstetrics and gynecology in Vienna and in Graz, Austria. In addition there have been some fifty-eight visitors from twenty-three foreign countries remaining as observers in this department for varying periods of time.

Of the seven guest lecturers in the department, two have been from abroad. These included Professor H. Bautzmann of Hamburg, Germany, and Professor Dellepiane of the University of Turin, Italy.

The teaching of undergraduate medical students has remained essentially unchanged. Dr. Alan F. Guttmacher and Dr. Carl T. Javert, clinical professors of obstetrics and gynecology at Mount Sinai and at the Woman's

Hospital, respectively, have each lectured to the third-year students. The teaching of fourth-year gynecologic pathology, since the death of Professor Engle, has been taken over, probably on a temporary basis, by Dr. Harold M. M. Tovell with the assistance of some of the residents.

The special seminars for the fourth-year students on research aspects of obstetrics and gynecology by a research member of the department have continued. The responsibility for the continued education of the resident staff at a graduate level continues in the form of rounds, weekly conferences, and instruction in gynecological pathology.

Special reference must also be made to the favorable development of the graduate program in maternity nursing. For the year 1957-1958, eight students are enrolled. All of these students are working for the Master of Science degree and will complete the course in September, 1958. The clinical portion of the program has developed entirely under resident supervision this year which seems to have resulted in increased satisfaction for students and staff.

Weekly lectures and case presentations have been given on the emotional aspects of obstetrical and gynecological conditions to the fourth-year section of students by Dr. Lothar Gidro-Frank of the Department of Psychiatry. Professor Seymour Lieberman has given three lectures to the first-year class and he, with Dr. Samuel Solomon, has served as instructor in the laboratory section of the first year biochemistry course.

The clinical work of the department in the Presbyterian Hospital and in the Francis Delafield Hospital remains virtually unchanged with respect to the number of patients cared for. There were a total of 4,190 deliveries in the Sloane Hospital, 2,779 of these on the ward service. This represents an increase of 963 ward deliveries over the figure for ten years ago. On the gynecologic service there were a total of 1,902 operations, of which 919 were from the wards. In the outpatient department there were 16,793 visits to the gynecologic clinics and 24,781 to the obstetrical.

The work at the Francis Delafield Hospital has become an important part of the teaching and clinical functions of the department. A schedule of rotation brings eight members of the department over to the Hospital for tours of duty there each year; a member of the Sloane Hospital resident staff spends a part of his first and again of his fifth year there; fourth-year students participate in the weekly case conferences.

The research program of the department may be divided into five or six principal areas, namely endocrinology and fertility, the physiology of pregnancy, labor and parturition, the fetus and the newborn and neoplastic disease.

In the laboratory of Professor Seymour Lieberman, work continues on the isolation and identification of various steroid hormones and on the tracing of the biochemical pathways of their formation and interconversion. Dr. Stanley Ulick's work on various aspects of the metabolism of aldosterone has progressed. Dr. Ulick has begun the study of the adrenal secretory rate

of this substance in various edematous states including toxemia of pregnancy. Drs. Samuel Solomon and Raymond Vande Wiele have been studying biosynthetic pathways of certain steroids. They have been especially interested in the biosynthesis of progesterone and estradiol and in determining the intermediates that exist between cholesterol and pregnenolone.

In the endocrine laboratory of Professor Joseph W. Jailer, investigations have been carried on concerning Cushing's syndrome with reference to bilateral adrenal hyperplasia. Drs. Kitay and Holub have perfected a technique for assaying minute amounts of ACTH which depends upon the release of corticosterone by isolated adrenal slices.

Professor Anna L. Southam has continued her work on the clinical uses of the important new steroid compounds with progestational activity. In connection with this work, Dr. Southam, in collaboration with Drs. Margaret E. Long, and Prabhakar Shah has completed the evaluation of histochemical reactions in the human endometrium following administration of 17-Ethinyl-Estreneolone. Professor Southam's book, entitled *Human Infertility*, written in collaboration with Professor C. Lee Buxton of the Yale University School of Medicine, was published during the last year.

Dr. Robert A. Munsick, working under Professor Harry B. van Dyke of the Department of Pharmacology, is investigating the comparative pharmacology of the neuro-hypophyseal hormones and some of their synthetic analogues. The importance of this work to obstetrics, concerned as it is with pressor, anti-diuretic, and oxytocic principles, is quite evident.

The earliest stages of human development remain the principal interest of Professor Landrum B. Shettles. The living human ovum has been studied and photographed in its natural yellow color.

Professor Harold Speert has made interesting observations on the endometrium of specimens obtained by hysterectomy in the presence of ectopic gestation.

The broad project undertaken by Professor Albert A. Plentl and his group to study exchange mechanisms for water and other substances across the placenta has continued to unfold. A series of elaborate clinical experiments on water exchange mechanisms during early pregnancy were carried out under the auspices of the Association for the Aid of Crippled Children in Stockholm, Sweden. The various tracer analyses on body fluids and tissues were carried out here at Columbia, this work consuming the major part of 1957.

Numerous experiments on primates (Rhesus monkeys at term) were carried out concurrently in an effort to determine the exchange mechanisms of elements and organic metabolites which, because of radiation hazards, could not be done on the human. Methods for the simultaneous determination of hydrogen-and carbon-tagged compounds have been perfected and a series of degradation procedures were worked out and checked. Dr. Mary Jane Gray has been associated with further work using deuterium oxide as a tracer to determine the origin of the amniotic fluid. As a part of this

project she has been studying direct diffusion from the vessels of the umbilical cord into the amniotic fluid in the monkey.

The important role of the steroid hormones in the regulation of the physiology of pregnancy is likewise under investigation. Dr. Shlomo Burstein, also in the laboratory of Professor Lieberman, has been studying the highly polar corticosteroids. Dr. Vande Wiele and Professor Henry Clay Frick II are working on an *in vivo* technique for the perfusion of the uterus in pregnant and nonpregnant animals with the view to the development of an experimental procedure that would permit the study of the metabolism of the steroids and the effect of the gonadotrophic hormones on these processes during pregnancy.

The investigation of the function of the placenta is difficult because of its inaccessibility. Dr. William A. Little is approaching the study of the abnormal placenta in two ways. First, a large series of placentas is being studied from an anatomical standpoint. These qualitative data are being correlated with the clinical course of the newborn infant in order to determine the significance, if any, of these lesions.

A number of serum protein and enzyme alterations have already been noted as occurring in pregnant women. Dr. Little is combining with his morphological survey of the placenta a study to ascertain the clinical significance of serum lactic dehydrogenase and enzyme changes in the blood.

In further work on the placenta, Dr. Friedman is carrying out metabolic studies to test the theory that the placental tissue itself might compete with the fetus for the available oxygen supply and so produce conditions having a deleterious effect on the infant. The work of Dr. Louise L. Phillips on the fibrinolytic enzyme systems in normal pregnancy, as well as in those cases of obstetrical accidents associated with hypofibrinogenemia, is this year being correlated with these placental studies. All of this work on the placenta may be regarded as a part of the general project on cerebral palsy since there is obviously a possible relationship between placental defect and fetal damage.

In the laboratory of Professor Gilbert Vosburgh a number of projects related to pregnancy physiology are under way, a number in collaboration with residents or medical students. Professor Vosburgh himself is concerned with the perfection of a very sensitive method for estimating magnesium in biological materials. In his laboratory Mr. Herbert Klein has completed a study on the *in vitro* uptake of l-ascorbic acid by human placental tissue, and Mr. James Weir has investigated the protein fractions of the human amniotic fluid. Outstanding have been the studies of Dr. Vincent J. Freda of the resident staff, on the presence and concentration of human blood group substances in the maternal-fetal barrier and amniotic fluid.

Studies by Professor Plentl, in association with Dr. Friedman and Dr. Gray, have been concerned with substances which may stimulate the contraction of the uterus in labor.

Professor Charles M. Steer has completed and submitted for publication

his exhaustive study of the Sloane Hospital's experience on the correlation of x-ray measurements of the pelvis and fetal dimensions and the outcome of labor. He is continuing his work on the development of a device to record the electrocardiogram of the unborn fetus. With Dr. Arnold Fenton, Professor Steer completed also a clinical study of fetal distress during labor.

During the year the department joined with the Departments of Pediatrics, Anesthesiology, and Neurology in a long-term study of the causes of cerebral palsy, a project in which a dozen other medical institutions participated. The general coordinator of the project in the Columbia-Presbyterian Medical Center is Professor D. Anthony D'Esopo. Working with him so far as the work of this department is concerned are Drs. Gray and Friedman. The program consists primarily in the detailed clinical study of 500 pregnancies each year, with records of every possible factor in pregnancy, labor, or the early neonatal period that might possibly cause cerebral damage to the fetus or infant, and thus eventually lead to cerebral palsy or other neurological disease of childhood.

Reference may also be made here to the studies of Professor Virginia Apgar and Dr. L. Stanley James, of the Department of Anesthesiology on the establishment of respiration and the changes in circulatory mechanisms that occur shortly after birth. Details of this work will be found in the section of the report on pediatrics or anesthesia, this being also a cooperative study.

The causes of "fetal wastage" in the last decade at the Hospital were analyzed by Professor Charles Steer. A number of other, somewhat isolated, observations have been made on the fetus or the newborn by Dr. Solomon, working with Professor Jonathan T. Lanman of the Department of Pediatrics at New York University. Dr. Little, with Professor William A. Blanc of the Department of Pathology, has a study in progress evaluating the importance of placentitis in neonatal mortality and morbidity. Dr. Little is undertaking a more extensive study of the significance of variations in umbilical vascularity. Dr. Louise L. Phillips has compared the fibrinolytic enzyme in maternal and cord blood.

The role played by the steroid hormones in the causation of cancer continues to be regarded as an important one. Much of the work cited earlier in this section which is being done in the laboratories of Professors Jailer and Lieberman may be regarded as cancer-related in this basic sense. At a more clinical level Professor Saul B. Gusberg with Dr. Robert E. Hall is studying a most interesting series of cases of women who have developed adenocarcinoma of the endometrium following prolonged estrogen therapy. Dr. Harold M. M. Tovell is investigating the possibility of a growth response to hormones by the same tumor, i.e., endometrial adenocarcinoma, growing in tissue culture.

Studies on the radiobiology of cervical cancer under Professor Gusberg have progressed to a point where certain tentative opinions may be held, and the possibility of separation of tumors into radioresistant and radio-

sensitive types envisaged. Dr. Tovell is studying radiation response also, but is testing the effects of x-ray on explanted human epidermoid cancer. He is attempting to find a correlation between original histologic characteristics and the biologic behavior of the carcinoma following retransplantation into conditioned hamsters.

Progress is also to be reported on the collaborative investigation designed to search for the biological and biochemical factors associated with the "malignancy" of gynecological, especially ovarian, tumors. This program is under the general supervision of Professor Lieberman and Taylor and is divided in a general way into four parts, namely, histochemistry (Dr. Margaret E. Long), biochemistry (Dr. Helena de Roethth), cellular fractionation (Dr. Hyman Guthwin), and spectrophotometry (Dr. Saul Bader).

Cytochemical observations on nucleoli and nucleolar ribonucleic acid have been completed on a series of forty-one histologically graded cervical epidermoid carcinomas and on ten benign cervixes by Dr. Fumio Doko under Dr. Long's direction.

Dr. de Roethth has been studying the metabolic behavior of gynecological tumors. Chromatographic studies are also being carried out on the radioactive protein fractions to localize the site of the labeling. Dr. de Roethth is also studying the survival rates of tumors by following glycolysis and oxygen consumption throughout a period of storage at room temperature.

Dr. Guthwin has begun a long-range program designed to permit the separate study of the various cellular components in gynecological tumors. An attempt is now being made to separate the tumors by several techniques, primarily differential centrifugation, into various cellular fractions, which then are to be studied with a variety of chemical and cytological methods.

Dr. Bader observed ovarian papillary serous tumors. At present, investigations are under way to elucidate cytochemical differences between the viable cell type of the ovarian papillary serous tumors and the nonviable types in the cell population. He is also investigating the changes in the cell population of normal tissues grown *in vitro*.

The treatment of the cancer patients at the Presbyterian and Francis Delafield Hospitals is planned for with the greatest care and details of response are recorded in such a way as to give maximum eventual information on types of therapy to be preferred. A follow-up system under the supervision of Dr. David B. Moore does its utmost to keep track of all cancer cases that have been admitted to either hospital.

Professor Harold Speert has completed a three-year historical study on the hundred human names most commonly identified with anatomical parts, diseases, operations, tests, instruments, and other items of obstetric and gynecologic interest. A series of seventy-nine essays, many of which have been published separately, have been incorporated into a volume, soon to be published by the Macmillan Company, under the title, *Obstetric and Gynecologic Milestones*. Professor Alvin J. B. Tillman continues work on his projected book on toxemia of pregnancy. Under the editorship of Pro-

fessor D'Esopo and Drs. Hall and Tovell, the *Bulletin* of the Sloane Hospital for Women is in its fourth year of publication.

Members of the department were very active in their participation in the meetings of medical and scientific societies throughout the country during the past year. Some twenty-four outside lectures or reading of papers are listed, these comprising, however, only the more formal presentations.

Professor Gusberg was elected to fellowship in the American Radium and the American Gynecological Societies. Professor Taylor is president of the latter society for the current year. Professor Lieberman has served as advisory member of the Committee on Research and on the Pathogenesis of Cancer of the American Cancer Society. Professor Jailer has been elected to the Association of American Physicians and to the editorial board of the *Journal of Clinical Endocrinology*. Dr. Hall has been appointed assistant editor of the *American Journal of Obstetrics and Gynecology*.

Professor Plentl made interesting trips to Sweden and India in search of material for his work. Professor Lieberman spent a six-month sabbatical leave as visiting scientist to the Cancer Chemotherapy National Service Center at the National Institutes of Health in Bethesda. Professor Engle returned in September, 1957, only a few months before his death, from a year's sabbatical leave in which he visited over forty medical schools as part of a survey of the research activities and facilities of departments of obstetrics and gynecology throughout the country.

Ophthalmology

EXECUTIVE OFFICER: Professor John H. Dunnington

During the year a more detailed study of neuro-ophthalmology has been started under Dr. Frank Payne. The department suffered a great loss in the resignation of Professor John P. Macnie. Dr. Anthony Donn, a former resident, has joined the department.

Guest lecturers during the year were Drs. M. J. Roper-Hall and P. Jameson Evans of Birmingham and Messrs. E. S. Perkins and James H. Doggart of London. We were also honored by a visit from Sir Stewart Duke-Elder, the director of the Institute of Ophthalmology of London.

Professor George K. Smelser and Miss Victoria Ozanics have studied the development of corneal transparency. In collaboration with Professor George D. Pappas of the Department of Anatomy electron-microscopy studies have been initiated on the ciliary epithelium. The changes in the ultra structure of this epithelium as affected by attempts to alter the rate of aqueous humor

formation and drainage have been observed and the results of these experiments were reported at the meeting of the Association for Research in Ophthalmology in San Francisco in June, 1958.

Professor Zacharias Dische, working with Dr. George R. Merriam, Jr., investigated the chemical changes that take place in the crystalline lens during the formation of cataract. Using the rat as the experimental animal, cataracts were produced by x-ray irradiation and by inducing tryptophan deficiency. In another series of experiments, Professor Dische studied the oxidation of the lens proteins. He is also continuing his researches on the biochemistry of the polysaccharides of the vitreous and in conjunction with Dr. Godfred Larsen has studied the effect of endocrinological factors on their synthesis.

Professor Seymour P. Halbert, who in 1956-1957 spent his sabbatical leave doing research in the laboratories at the Sir William Dunn School of Pathology, Oxford University, England, returned to continue his studies on the purification of streptococcal antigens proven to be produced *in vivo* during human infections. In conjunction with Miss Patricia Fitzgerald, immunizations of rabbits were carried out with heterologous lenses and the antigenic interrelationships of the species used were investigated. Working with Mrs. Dvora Friedman, studies with mixed bacterial infections have been continued. Attempts were made to analyze the dynamics of the inhibition of the *Shigella* resulting from the *in vivo* antibiotic production by the active *E. coli* strain.

Dr. D. Locatcher-Khorazo is studying bacteriophage typing of staphylococci isolated from various ocular infections as well as from normal eyes.

Dr. Virginia Weimar has kept up her research on the early biochemical, physiological, and morphological reactions to wounding in corneas. In collaboration with Professor Dunnington she has studied the role of the corneal epithelium in stromal healing.

Dr. Godfred Larsen, a Knapp Fellow, has investigated the distribution of the mast cells in the uveal tract of the eye. He has also studied the incorporation of radio sulphur in the eyes of guinea pigs. The findings were reported before the Association for Research in Ophthalmology in San Francisco in June, 1958.

Dr. Anthony Donn returned July, 1957, from a ten-month fellowship at the Institute of Ophthalmology in London where he studied the problem of corneal transparency. During the past year he has continued his investigations and has devised a technique for keeping an excised cornea alive and functioning *in vitro* for eight hours. This work was presented at a meeting of the Association for Research in Ophthalmology in January, 1958.

Dr. Charles J. Campbell and Miss Catherine Rittler have expanded the activities of the Knapp Memorial Laboratory for Physiological Optics to provide a comprehensive profile of the functional status of the retina. In addition to establishing the range in normal individuals, they have studied a wide variety of pathological entities involving the retina. These new func-

tional values offer a different concept of various pathological entities, and afford greater precision in prognostication. Investigations of flicker perimetry, electroretinography, and fading time values as aids in the early diagnosis of chronic simple glaucoma have been continued.

With the aid of a new electronic pupillography, Dr. Otto Lowenstein and Miss Irene Loewenfeld have recorded the changes in the pupillary reactions in various ocular diseases and continue to make valuable contributions to the literature on the diagnostic importance of these findings.

Among the research projects of the clinical members of the department are the culture of uveal melanomas by Professor Algernon B. Reese in collaboration with Dr. Gabriele Ehrlich; initial changes in ocular wound healing by Professor Dunnington with the assistance of Dr. Ellen F. Regan; the measurement of the amount of radiation delivered to the lens from various diagnostic x-ray procedures by Dr. George R. Merriam, Jr.; the factors influencing orbital growth and size by Dr. Ira S. Jones; the metabolism of the ciliary body in relation to the pathogenesis of glaucoma by Andrew deRoeth, Jr.; the mechanical effects of various operative procedures in retinal detachment by Dr. Graham Clark; the effects of various pituitary preparations on the eye of fish by Dr. Robert M. Day; and the isolation and tissue culture studies of ocular viruses by Dr. Robert P. Burns. The resident staff has kept up its interest in research. Drs. Robert Ellsworth, Harold Spalter, Howard Lucas and G. Richard O'Connor are busily engaged in an etiological study of uveitis which includes newer laboratory approaches to the disease, such as hemagglutination test for the antibodies of toxoplasmosis. Dr. Spalter is evaluating the usefulness of the ophthalmodynamometer in the diagnosis of carotid artery thrombosis. He is also collaborating with Professor Reese and Dr. George A. Hyman of the Department of Medicine in the treatment of retinoblastoma by using C^{14} labeled triethylene melanine to determine the effectiveness of various routes of administration of the drug.

During the past year the members of the department have been most active in various national organizations such as the Association for Research in Ophthalmology; the sectional meetings of both the American College of Surgeons and the American Medical Association; the American Ophthalmological Society, and particularly the American Academy of Ophthalmology and Otolaryngology. At the annual meeting of this latter society fifteen members gave instructional courses, five were on the scientific program and three had exhibits. At additional meetings throughout the country, a total of seventy lectures have been given by members of the department within the past twelve months. The twenty-second edition of May's *Diseases of the Eye* as edited by Professor Charles A. Perera has been published within the year, as has Haik's *Diseases and Surgery of the Lens* with Professor Dunnington as a contributor and Fasanella's *Management of Complications in Eye Surgery* with Professor Raynold N. Berke as one of its collaborators.

It is gratifying to enumerate some of the honors and positions of trust that have been held by members of the department in the past year. Pro-

fessor Reese has received the Proctor Medal of the Association for Research in Ophthalmology and was guest of honor at the sixty-second annual meeting of the Japanese Ophthalmological Society in Niigata City, Japan. Professor Gordon M. Bruce has continued as editor of the *Transactions of the American Ophthalmological Society* with Professor Charles A. Perera as associate editor. Professor Maynard C. Wheeler has served as secretary-treasurer of the American Ophthalmological Society. Professor Dunnington delivered the twentieth George E. deSchweinitz Lecture before the College of Physicians in Philadelphia. He was elected to honorary membership in the Ophthalmological Society of the United Kingdom, and he is also president-elect of the American Academy of Ophthalmology and Otolaryngology and vice president of the National Society for the Prevention of Blindness. Dr. Ellen F. Regan was elected to membership in the American Ophthalmological Society.

Orthopedic Surgery

EXECUTIVE OFFICER: Professor Frank E. Stinchfield

The department has maintained a steadily increasing momentum in teaching and research. Forty-three scientific papers have either been published or are in the process of being printed, or are completed and awaiting publication. Over seventy-five lectures, papers, and presentations have been delivered in the United States and various foreign countries, and fifty-nine research projects are currently in progress.

Undergraduate instruction has been consolidated in an effort to utilize more effectively the teaching hours available. Under the direction of Professor Charles T. Ryder and Dr. Alexander Garcia, the second postgraduate course in orthopedic surgery was organized, presented, and received enthusiastically by surgeons enrolled from many sections of the United States. Under the direction of Professor Robert E. Carroll, a formal course of instruction in the basic sciences was organized for the benefit of the orthopedic residents in training.

The refreshingly different concepts of therapy and pedagogy gleaned from a constant procession of visiting foreign and American orthopedists remained a continuing challenge and stimulus to the established practices of the department. Professor H. Relton McCarroll of Washington University spent one week with the department as a guest lecturer and devoted a major portion of his time to the medical students and residents.

The histochemical research laboratory, under the direction of Professor

Gabriel C. Godman, enjoyed a productive year. Nine reports documenting his cytochemical studies in systemic lupus erythematosus and other histochemical problems were published. Other investigations in progress include studies on the ultrastructure of cartilage and the histochemistry of chondrogenesis, biochemical and cytological studies of putative osteoblasts, cytochemical studies of nucleoproteins in cell differentiation and tumor growth, and the development of adenovirus infections in cell nuclei. Professor Godman has been appointed visiting investigator to the Rockefeller Institute for Medical Research.

Dr. C. Andrew L. Bassett has continued his work on the sterilization of homogeneous bone transplants and, under the auspices of the department, prepared and presented an exhibit, "Cathode Ray Sterilized Bone Grafts," illustrating the perfected technique for this procedure and the results of three years of clinical experience with the method in this institution. With Professor James B. Campbell of the Department of Neurological Surgery and Professor Charles R. Noback of the Department of Anatomy, Dr. Bassett continues the investigation of nerve tissue regeneration by millipore filter techniques and the results so far are encouraging. Several reports documenting the results of these studies have been published.

Professor C. Zent Garber of the Department of Pathology, in charge of orthopaedic pathology, has continued his studies on bone marrow circulation, on radiation necrosis of bone, and with Professor Frederick M. Smith and Dr. Philip Zeitler is making a study of typhoid osteomyelitis. Two important reports relating to the mathematical treatment of chromatography, written by Mr. Abdel S. Said of the Department of Pathology, have been accepted for publication.

Professor Halford Hallock has maintained his interest and activity in reconstruction surgery and has made a significant contribution to this subject in a recently published article, "Arthrodesis of the Hip in Poliomyelitis." In collaboration with Drs. Kenneth C. Francis and James B. Jones, he also published an excellent report, "Spine Fusion in Young Children."

Professor Harrison L. McLaughlin has presented and published a number of papers, and was invited to present the annual oration on trauma at the Congress of the American College of Surgeons on the subject, "Education in Trauma." He has completed his *Textbook of Trauma* for publication.

Professors Melvin B. Watkins and Everett C. Bragg have continued their studies of problems relating to the low-back mechanism. Dr. Bragg has published several excellent papers documenting his findings, and Dr. Watkins has completed a report describing an original operative technique for spinal fusion in difficult cases. Professor Sawnie R. Gaston is making a comprehensive analysis of the treatment of congenital club foot.

Professor Charles T. Ryder has completed his assignment in the fetal life study carried out under the auspices of the Department of Pediatrics, and is assessing the results. In collaboration with investigators from other institutions, he is participating in a broad study of the problem of coxa plana.

Professor Frederick M. Smith has remained active in the field of trauma and has presented and published a number of articles related to the care of accidental injuries. Professor Charles S. Neer II has perfected the form and use of the artificial shoulder prosthesis which he originated and which is now widely used in accordance with the criteria developed from his investigations. Professor Robert E. Carroll remains very active in the field of hand surgery and has published several excellent papers on this subject.

Dr. Alexander Garcia has continued his study of geriatric trauma, and with Professor Neer has contributed two publications on injuries to the knee joint. Drs. George B. Ambrose, Alexander D. Papas and Professor Neer are studying different aspects of injury to the hip. Dr. D. Keith McElroy has continued his studies of antibiotic therapy in bone and joint tuberculosis and of the surgery of cerebral palsy. Dr. Kenneth C. Francis has organized a bone tumor clinic and is beginning an intensive study of bone neoplasms.

The resident staff continues to exhibit both an interest in research and varying degrees of aptitude for it, and virtually all members are at work on at least one project. The problems elected for study have embraced all strata of clinical and laboratory investigation, and the net effect, in terms of stimulating the intellectual curiosity and molding the patterns of scientific approach to clinical problems in these young men has been gratifying.

The retirement of Professor William H. von Lackum and the resignation of Professor Frederick M. Smith reflect serious losses to the department. In the process of attaining positions of international acclaim as leaders in their respective fields, each has contributed in no small measure to the pre-eminence of this institution. Dr. J. William Fielding, who will continue Professor von Lackum's pioneer work in the field of scoliosis, has been appointed instructor in orthopedic surgery.

Otolaryngology

EXECUTIVE OFFICER: Professor Edmund P. Fowler, Jr.

Renewed interest in otolaryngology throughout the world and in this country in particular, has produced a sudden increase in the demand for residencies. This is probably due to new and exciting advances in otology and cancer surgery of the head and neck as well as the spreading of the knowledge that there are topnotch opportunities for well-trained ear, nose, and throat men in every branch of the specialty, from full-time research or teaching to private practice and the Services.

The brevity of the third-year introductory course in otolaryngology, which

was continued this year very much as it has been in the past, has never seemed commensurate with the importance of the ear, nose, and throat in human disease. It is presently necessary to include teaching of the basic anatomy of the head and neck as well, thus further cutting the amount of time available for introducing the students to what they should know about the subjects, regardless of their future specialty.

Medical students seem to show more interest in the third-year course and more are selecting otolaryngology for their elective period. Outstanding in his elective period, this year, was Raymond Strauss, a fourth-year student from Western Reserve University who was awarded the Coakley Memorial prize for his excellent work on the wards as a clinical clerk and also for a fine paper on the audiometric findings and neuropathology of acoustic neuroma. Richard Chase, a third-year medical student, spent his spare time, for the last several years, on pilot studies and perfecting the experimental design for definitive experiments on delayed speech feedback. He has also begun work on the delayed feedback mechanism in other systems and the effect of delayed auditory feedback in various languages and in children. Mr. Chase's work was inspired and supervised by Dr. Samuel Sutton of the Department of Biometrics in the New York State Psychiatric Institute, with the collaboration of the section on speech and hearing of the Vanderbilt Clinic.

In another project Professor Edmund P. Fowler, Jr., and Dr. Milos Basek have collaborated with Drs. Howard J. Page and Jacob Rutschmann of the Department of Psychology in the New York State Psychiatric Institute. This project consisted of the application of a tiny magnet to the ear drum and activating it with the use of an electromagnet, which in turn was activated by alternating currents from a controlled oscillator.

Professor Malcolm B. Carpenter of the Department of Anatomy is beginning electronic studies of the retrolabyrinthine tracts of the vestibular system with Professors Fowler and Franz Altmann and with Professor Karl O. Lowy of the Department of Otolaryngology of the University of Rochester. After extensive trials in the laboratory, Professors Altmann, Fowler, and Jules Waltner, assisted by Drs. Basek and Vladimir N. Epanchin, have started using an ultrasonic machine developed by Professor M. Arslan of Padua, Italy, for the partial destruction of the human labyrinth in Meniere's disease.

Professor Altmann has finished a monograph on severe malformations of the head and another with Professor Zollner of Freiburg, Germany, on tympanoplasty. He gave a course at the American Academy of Ophthalmology and Otolaryngology in Chicago on tympanoplasty. With Professor Waltner he gave a preliminary report on the treatment of Meniere's disease with ultrasonic waves at the American College of Surgeons in New York.

Professor Daniel C. Baker has continued with his work in the American Medical Association Subcommittee on Accreditation of Hospitals for Residency in Otolaryngology. He was elected a fellow in the American College

of Chest Physicians, elected to membership of the American Board of Otolaryngology and secretary of the section on otolaryngology of the New York State Medical Society. With Professor Charles A. Flood of the Department of Medicine he presented a paper on cardiospasm at the meeting of the American College of Surgeons in New York.

Professor John J. Conley's major research interest in the past year has been in the fields of physiology of swallowing and postoperative repair following extensive head and neck surgery at the American Academy of Ophthalmology and Otolaryngology in Chicago. He was a guest speaker at the eastern section of the Triological Society; the Gill Memorial Hospital, Virginia, for their thirty-first Annual Spring Congress; the spring seminar of the University of Michigan; and the American College of Surgeons in New York.

Professor Waltner continued his work on histological demonstration on the origin of the endolymph. He also continued his work on roentgen diagnosis of chronic mastoid disease and is preparing a contribution on the x-ray diagnosis of chronic mastoid disease for Golden's *Looseleaf Roentgenology*. He was elected to the New York Otological Society. With Professor Altmann he presented a paper at the American College of Surgeons in New York.

Professor Fowler has served on several panel discussions of stapes mobilization in various parts of the country. In addition, he has presented material on sudden deafness and the misuse of dihydrostreptomycin. He was elected secretary of the section on otolaryngology of the New York Academy of Medicine and president of the Microcirculatory Conference.

Mrs. S. Kastein of the speech and hearing clinic, has been working with the Department of Pediatrics in a study of premature children and has found a very high proportion of speech disorders in this group.

In collaboration with Dr. Stuart W. Cosgriff of the Department of Medicine, Professor Fowler has been working on a regime of anticoagulation therapy. In collaboration with Professor Joseph Moldaver of the Department of Neurology a better rationale has been found for the operative treatment of Bell's palsy.

Dr. David A. Hilding has finished a pilot study with radioactive isotopes with the help of Professor Edith H. Quimby of the Department of Radiology. With radiographs and an ingenious method of opening the cochlea of fresh guinea pig specimens, we believe that this work may be of considerable importance in the understanding of tinnitus and the sensory neural deafnesses.

Professors Fowler and Altmann and Dr. Basek have continued their studies of otosclerosis. Dr. Elio Maggion, a Fulbright Fellow from Naples, Italy, has been investigating the effect of bacteria on small blood vessels and their surrounding general substance.

Perhaps most notable in this report is that the Department of Otolaryngology is collaborating with so many other departments, some basic-science and some clinical. It was for this that the Medical Center was created but it is interesting to see how extensive such research collaboration can be in a single small department, not to mention the normal clinical consultations and contacts.

Pathology

EXECUTIVE OFFICER: Professor Harry P. Smith

It has often been noted that the leading universities have important responsibility for the training of leaders needed by other colleges and institutions. The department offers its facilities and its energies to the graduate students of all departments, in an effort to provide them with a grasp of the way in which the fundamental disciplines are brought together in the study of disease.

The department has a direct responsibility for the training of academic leaders among physician members of the department. This is of the greatest importance, since the field of pathology has been expanding both in breadth and in depth in the past few decades. There is a dearth of well-trained pathologists throughout the country. The department has recently provided executive officers for departments of pathology in two other medical schools. The department has also supplied many younger men, instructors and assistant professors, to other institutions. It plans to continue these policies of extending its influence outward, even though the retention of these men at Columbia might increase its influence and prestige locally.

The training of academicians has been fostered in no small degree by the liberal support which is given for fellows and trainees by the federal government and by some of the far-sighted foundations. Outstanding utilization of such support has been made above all by the division of neuropathology. Neuropathology is a field in which the shortage of trained personnel is particularly acute throughout the country. The department here is one of four or five which is making every effort to meet this national need. In the last five years alone, our division has been able with outside support to train twelve young neuropathologists, many of whom have already accepted positions of major responsibility in other academic centers.

More recently a program of research fellowships for medical students has been initiated by the United States Public Health Service. Such fellowships permit second-year medical students to interrupt their systematic instruction for a year in order to devote their full time and energies to research in one or another of the basic science departments. The department was fortunate in securing Mr. Kendall Kane. He is spending the year working on the chromatography of hemaglobin in conjunction with Professors Fred V. Lucas and George P. Vennart. He has also devoted a part of his time to the autopsy service and to the instruction of second-year medical students, thus acquiring additional experience and knowledge. During the coming year the depart-

ment has again secured one of the student fellowships offered by the United States Public Health Service. Independent agencies are becoming interested in this type of program and additional funds can be secured to supplement those supplied by the federal government. There is strong evidence that such programs of student research are becoming increasingly popular with medical students. Seemingly, this is related to the recently aroused interest of the general public in all fields of research. It is important that opportunities for research be provided to larger numbers of medical students and that they be made available early in the students' careers.

The research activities of the department are numerous and varied. In the division of general pathology Professor Fred V. Lucas, in collaboration with Professor Wellington B. Stewart and Dr. William McLendon, has conducted experimental studies on the heme pigments of the dog. These studies are an outgrowth of continuing studies on hemoglobin by Professor Lucas in conjunction with Professor George P. Vennart and Mr. Kendall Kane.

Professor Vennart has also collaborated with Professor Stewart on the experimental production of nutritional disorders in the liver of the rat. Professor Lucas and Dr. John B. Henry are conducting experimental chemical studies on the relation of the female sex hormone, estrogen, to the oxidative enzymes of the uterus of the rat. Professor Stewart has extended his earlier work on the kinetics of iron absorption and has secured interesting information on factors which affect such absorption. Dr. Richard L. Naeye and Professor Vennart have made extensive studies of the pulmonary vasculature in cases of long-standing arterial hypertension.

Dr. Naeye has also conducted a study of cardiac and pulmonary systems of patients afflicted with congenital malformations of the heart.

Professors David Cowen and Abner Wolf and Dr. Lester Geller of the division of neuropathology have continued their studies of perinatal damage to the nervous system. Professors Wolf and Cowen have undertaken a study of the effects of 6-amino nicotinamide on the central nervous system of rats, cats and monkeys. Professor Cowen and Dr. Geller are completing a report on the effects of x-ray irradiation of the rat fetus, with particular reference to subsequent development of the testis. Dr. Sung is collaborating with Professors Wolf and Cowen on the delayed effects of x-rays on the mature brain. Dr. John Potanos is also collaborating in a study of the reaction of glial tissue of the brain to nitro-B-tetrazolium. Professors Cowen and Wolf participated in a symposium on perinatal infections of the nervous system, under sponsorship of the American Association of Neuropathologists. Professor Wolf also participated in a symposium on allergic encephalomyelitis at the National Institutes of Health and one on aneurotic family idiocy at the Isaac Albert Research Institute. He has also received recognition by being appointed assistant editor of the *Journal of Neuropathology and Experimental Neurology*.

In the division of pediatric pathology, Professor Dorothy Andersen and Professor William Blanc have continued their studies of cystic fibrosis; in doing so they have secured full cooperation of various members of the De-

partment of Pediatrics. Professor Blanc has conducted studies on various aspects of neonatal death, including cytomegalic inclusion disease and amniotitis. He is also making a study of intraventricular hemorrhage in premature infants. Professor Dorothy H. Andersen serves as consultant to the Armed Forces Institute of Pathology.

Professor C. Zent Garber, of the division of orthopedic pathology, has conducted studies on bone cysts and on Paget's disease of bone, with particular reference to circulation of blood within bones. He and Mr. Abdel Said have completed certain of their studies on the physical chemistry of bone salts.

Professor Edith Sproul is currently making a study of kidneys of patients having high levels of calcium in the blood stream. She is also seeking to collect information regarding the important question as to whether tumor cells tend to enter blood vessels at time of surgical operations. Dr. Silvio Fiala has completed one phase of his work on carcinogenesis. Dr. John Gorman and Professor Arthur Purdy Stout have completed a review of certain rare types of mixed tumors of the skin.

Drs. Theodore F. Zucker and Lois M. Zucker have made highly significant contributions in two main fields of nutrition. The first contribution has to do with the complex roles of vitamins and hormones in prevention or production of duodenal ulcers in rats; the second, with the effects of genetic differences in separate strains of rats.

Professor Henry S. Simms and Dr. Benjamin N. Berg are conducting studies on longevity. Their studies have shown that there is a typical pattern for the onset of each disease of rats maintained under standard favorable conditions. Their studies on vitamin E treatment in relation to the muscular dystrophy of rats are nearing completion.

Professor Simms and Dr. Charles R. Harmison are continuing their studies on the fat-depositing action of the lipfanogens that are present in blood serum and on the influence of insulin on the level of these lipfanogens. The action of the opposing antilipfanogen is being studied in rabbits with experimental atherosclerosis.

Dr. Hans Kaunitz has collaborated with Dr. Charles A. Slanetz, curator of animal husbandry, and with Dr. Daniel Swern of the eastern regional laboratory of the United States Department of Agriculture. The research program of this group centers about the nutritional effects of normal and oxidized fats. These investigators have also conducted studies on electrolytes in normal and in adrenalectomized animals.

Pediatrics

EXECUTIVE OFFICER: Professor Rustin McIntosh

New appointments to the teaching staff include those of Professor Charles D. May, editor of *Pediatrics* and former department head at the University of Iowa; of Dr. Gebhard Koch as research associate; of Drs. Jacques R. Ducharme, Thurman B. Givan, Jr., Herman Grossman, Robert B. Mellins, and Herbert E. Poch as assistants. Dr. Melvin M. Grumbach was promoted to the rank of assistant professor; Dr. Katherine Sprunt and Dr. Gilbert W. Mellin to associate; and Dr. Saul Blatman to instructor.

Professor Ruth C. Harris was granted leave of absence for temporary residence in Lebanon, where she expects to work in the medical school of the American University of Beirut. Dr. W. Russell Smith and Dr. Frederick H. von Hofe retired after many years of faithful and valuable service to the department.

Among the many visitors to the department in the course of the year should be mentioned Dr. Werner Bustamante of Santiago, Chile; Professor W. R. F. Collis of Dublin; Dr. S. G. Gershon of Israel; Professor Y. Nisimaru of the University of Hiroshima; Dr. S. C. Sheth, dean of the Faculty of Medicine at Bombay University; Professor T. Takatsu of Tokyo University; Dr. J. M. Tanner of the London Institute of Child Health; Professor S. Van Creveld of the University of Amsterdam; and Drs. O. H. Wolff and B. S. B. Wood of the University of Birmingham.

No important changes have been effected in the teaching program. In general, each student receives an intensive course of five and one-half weeks' duration in his third year and another of one month's duration in his fourth year. In the third year, the teaching staff aims primarily to provide a background of knowledge of the ways in which an infant or child responds to the inner stresses of normal growth and development and to outer stresses reaching him in the form of causative factors in disease. At this stage an effort is made to acquaint the student with the more common illnesses and syndromes in their typical "textbook" form. In the fourth year, fortified with the basic clinical equipment he has assembled up to this point, he is in a position to play a responsible role as clinical clerk in the team management of patients' problems as they are brought both to the outpatient clinic and to hospital ward service. Over the course of years steady growth has taken place in the amount and type of clinical responsibility accorded to the undergraduate. Every effort

is made to transfer to him as much responsibility for the welfare of his patients as he is capable of accepting within the limits of safety and prudence. Results of this policy are clearly seen in enhanced interest and enthusiasm on the part of the students and equally in improved effectiveness of the learning process.

The research program in microbiology under the general direction of Professor Hattie E. Alexander has been especially fruitful. Working in collaboration with Dr. Gebhard Koch, Dr. Isabel Morgan Mountain, Dr. Katherine Sprunt and Miss Olga Van Damme, she has studied ribonucleic acid prepared from a polio virus and completely separated, so far as can be determined, from the usually associated protein component. These studies have important implications for a more complete understanding both of the nature of genes and of the fundamental processes involved in infection by viral agents. The somewhat analogous studies of the heredity determinants of bacteria, in which Professor Stephen Zamenhof of the Department of Biochemistry, and Miss Grace A. Leidy have taken part, have explored the differential stabilities of individual components of the bacterial cell-transforming principles. Dr. Sprunt, working with Dr. Mountain and Miss Winifred Redman, has manipulated the growth conditions applied to poliomyelitis viruses. Studies of the natural history of the initial infection with tuberculosis in young patients, as well as studies of the response of the infection to specific antibacterial treatment, have been continued with the collaboration of Dr. Saul Blatman and Professor Douglas S. Damrosch.

Professor Dorothy H. Andersen of the Department of Pathology has continued her collaboration with Dr. Carolyn Denning in studies of the clinicopathological correlations of cystic fibrosis of the pancreas. These investigations have thrown light on the role of tocopherol deficiency in malabsorption syndromes. A study of neuroanatomic lesions accompanying prolonged thiamine deficiency in an infant was published by Dr. Ruth Alice Davis and Professor Abner Wolf of the Department of Pathology.

Professor Paul A. di Sant'Agnese has pursued the collection, separation, and analysis of mucoproteins and mucopolysaccharides contained in secretions of the pancreas and other glands of the alimentary tract, continuing his fruitful collaboration with Professor Zacharias Dische of the Department of Biochemistry. The strange constancy with which *Micrococcus pyogenes* invades the respiratory tract of these patients has aroused the interest of Professor Calderon Howe of the Department of Microbiology, from whose collaborative inquiries into the ecology of this particular bacterium it is hoped that information of significance will be derived. Studies of adults with chronic pulmonary disease, carried out in collaboration with Dr. John A. Wood of the cardio-pulmonary laboratory of the Department of Medicine, have been undertaken with a view to determining the possible relationship of these ailments to cystic fibrosis of the pancreas, particularly in some of its atypical forms. Studies of the celiac syndrome have continued along two different lines previously launched. Professor Heinrich Waelsch of the Department of

Biochemistry has again helped in studying the response of celiac patients to administration of wheat gluten; and Professor Harold G. Barker of the Department of Surgery, has carried out studies of the intestinal absorption of food fats labeled with radioactive iodine in the hope of developing a relatively simple test by which clinical disturbances of fat absorption may be more readily identified. Diseases of glycogen storage constitute another group of metabolic disturbances to which Professor di Sant'Agnese has directed his interest. The clinical attributes of the various biochemical forms of the disease picture are being studied with a view to defining the distinguishing features of their symptomatology, course, and prognosis.

Professor Melvin M. Grumbach has joined with Professor Karl Meyer, of the Department of Biochemistry, in studies of biochemical abnormalities accompanying the rare genetic anomaly known as Hurler's syndrome. Additional evidence has been gathered to support the belief that ingestion of certain synthetic progestin preparations by the mother during pregnancy may produce malformations in female offspring. With the participation of Dr. Jacques Ducharme and of Mr. Lester Baker, a third-year medical student, the effects of a purified preparation of human growth hormone have been investigated by measuring the increment of growth in premature infants during a comparatively short time interval. Studies are in progress which have been designed to elucidate changes in the pattern of excretion of adrenocortical steroids with age and to measure the response to injections of adrenocorticotrophic hormone. In collaboration with Professor Ralph E. Molloshok various aspects of thyroid gland disorders in young patients are being intensively studied.

Collection and codification of observations made on infants admitted to the fetal life study continue to go forward under the supervision of Dr. Gilbert W. Mellin. An investigation of the Roentgen appearances of the lungs in a large population of apparently normal full-term newborn infants was brought to completion. Clinical observations of the palpability of the gastric pylorus in normal newborn infants have been correlated with an evaluation of the nonoperative treatment of congenital hypertrophy of the pylorus, in which Professor Harry S. Altman, Professor Thomas V. Santulli of the Department of Surgery, and Dr. Mary P. Kent have taken part. In a controlled scrutiny of various routine procedures to which newborn infants have for many years been subjected in the nurseries of the Sloane Hospital for Women, the antibacterial agents employed in prophylaxis against ophthalmia neonatorum were varied systematically. Dr. Mellin has served as pediatric coordinator of the program of rehabilitation of patients with cleft lip and cleft palate, in which several departments in both the College of Physicians and Surgeons and the Department of Dental and Oral Surgery have been represented.

Professor Conrad M. Riley's analysis of long-term results of treatment of the nephrotic syndrome has been extended to include new data submitted by a number of collaborating clinics. New analytic techniques have been applied

to the study of plasma lipids, proteins, and lipoproteins in nephrosis. In all of these investigations Dr. Peter R. Scaglione has been an active participant.

In the premature infants' unit of Babies Hospital, Professor William A. Silverman has systematically evaluated experimental changes in the environment to which the patient is exposed, in an effort to reach a precise and objective definition of optimal conditions.

Professor James A. Wolff and Dr. Anneliese L. Sitarz have collaborated with others in an organized attack on leukemia. In these studies, a number of university medical centers have joined forces for the purpose of arriving more rapidly at a critical evaluation of new therapeutic agents and programs proposed for the treatment of this disease in the acute form in which it commonly affects young patients.

Thirty-three papers were published in periodicals, and one book appeared under the joint authorship of Dr. Walter R. Kessler and Professor William B. Sherman of the Department of Medicine.

Pharmacology

EXECUTIVE OFFICER: Professor Harry B. van Dyke

The ratio of teaching staff to number of students in classes taking the course in pharmacology is well below a desirable level. The full-time teaching staff of the department now is five in number with responsibility for the instruction of about 40 dental students and 120 medical students. Limitations on expansion of the staff are imposed not only by limited funds but also by the scarcity of pharmacologists with suitable teaching and investigative qualifications for academic appointment. Although Professor Paul B. Brazeau resigned to join the Department of Pharmacology of the Albert Einstein College of Medicine on January 1, 1958, the department fortunately secured the services of Professor Wilbur H. Sawyer, formerly of the College of Medicine of New York University.

Much thought has been given to improvements in laboratory instruction with the sympathetic aid of Dean Rappleye. A generous grant from the Lilla Babbit Hyde Foundation permitted the purchase of television cameras, monitoring units, and receivers for demonstration experiments by closed-circuit television. This grant also enabled the department to secure a four-channel electronic recorder together with necessary accessory equipment such as strain-gauges for recording pressure changes or movements of the chest, muscles, or limbs. With such equipment, the students can view on large television screens as many as four correlated simultaneous events depicting

the varied actions of one or more drugs with a clarity which was never before possible. It is also feasible to demonstrate drug-responses by tissues previously inaccessible to nonelectronic recording devices. The response of the students has been enthusiastic. Demonstrations were given by all the teaching staff, including Dr. Jurg A. Schneider. Other experiments were performed by the students working in small groups. Groups of thirty medical students were also given the opportunity of visiting the research laboratories of one of four pharmaceutical manufacturers. The cooperation of other departments in the teaching of pharmacology in the second year was also an important aspect of instruction. Demonstrations of anesthesia in man were given by Professors Virginia Apgar and Shih-Hsun Ngai of the Department of Anesthesiology. Lectures in special fields were given by Professors Alfred Gellhorn and John V. Taggart of the Department of Medicine.

Research by medical students, suitably guided by a staff member, is a rewarding experience for both students and teacher with important potential long-term benefits to medical education. The Borden Award was given to Dr. Robert G. Grossman who had been a student investigator associated with Professor Shih-Chun Wang. Among other students who made significant progress in research under Professor Wang's guidance were Messrs. LeRoy L. Costantin, Bert Horwitz, and David Wolfe. Mr. Costantin reported on his investigation of afferent vagal impulses associated with pulmonary congestion at the spring meeting of the Federation of the American Societies for Experimental Biology. Mrs. Ora Mendelsohn Rosen was a student investigator associated with Professor Brazeau. Another student, Mr. Edward S. Kaplan, worked on a research project with Professor Frederick G. Hofmann.

Two graduate students completed all the courses required for the Ph.D. degree before undertaking research for the dissertation.

The second-year course in pharmacology is followed in the clinical years by a course in applied pharmacology in collaboration with the Department of Medicine. Professor Frederick G. Hofmann and Professor Hamilton Southworth of the Department of Medicine were the departmental representatives for this course.

The principal research interests of the staff ranged from endocrinology and neuropharmacology to renal physiology and pharmacology. In collaboration with Drs. Alfred A. Renzi and Herman I. Chinn, Professor Wang completed an investigation of the emesis associated with radiation sickness. He also collaborated with Dr. Rudolf P. Bircher of Sandoz Pharmaceuticals and Professor Herbert J. Bartelstone, in a study of the central effects of deslanoside, a digitalis glycoside.

Dr. Sarah S. Henry and Professor Harry B. van Dyke completed their study of the immunological properties of highly purified interstitial cell-stimulating hormone, one of the pituitary gonadotropins. The true hormone could be separated from a group of nonspecific contaminating substances. Dr. Robert A. Munsick, Professor Sawyer, and Professor van Dyke studied the intravenous potency of lysine and arginine vasopressins in trained pigs.

Professor Sawyer greatly improved the method of estimating antidiuretic hormone by intravenous injection into rats. He is continuing his study of the action of neurohypophysial hormones on the transport of water and ions across biological membranes such as the frog skin, bladder, and renal tubule.

Professors Bartelstone and Wang devised a method for the implantation of electrodes or cannulas for indefinite periods in the brains of cats and dogs. Professors Bartelstone and Brazeau and Dr. Bircher have made a detailed study of the central and peripheral venous pressures in conjunction with complete, brief occlusion of the pulmonary artery, the ascending aorta, or the great veins.

Professor Hofmann continued his study of the hydroxylation of adrenal cortical steroids, particularly of carbons 11 and 17. The conditions under which such hydroxylations occur were investigated by identifying adrenocortical secretions of adrenal glands surviving *in vitro*.

Professor C. Heymans of the University of Ghent lectured before the staff and students under the joint auspices of the Departments of Medicine and Pharmacology. Among scientific visitors who remained for short periods to acquaint themselves with the scientific activities of the department were Dr. Beryl M. A. Davies of the University of Glasgow and Dr. J. J. Reuse of the University of Brussels. Two Russian visitors, Professor G. N. Perschin and Dr. Mariya D. Ushakova of Moscow, were shown the research projects of the department.

Professor Wang was invited to lecture at an international congress on curare at Rio de Janeiro. He also lectured at the University of Recife in Brazil. Professor van Dyke organized and presided at a symposium on hormones at the autumn meeting of the American Society for Pharmacology and Experimental Therapeutics in honor of the late Professor John J. Abel. Professors Bartelstone, Hofmann, and Sawyer were elected to membership in the Harvey Society.

Physical Medicine and Rehabilitation

EXECUTIVE OFFICER: Professor Robert C. Darling

Recent surveys emphasize that the number of disabled persons in the country who can be helped by modern professional rehabilitation services to achieve partial or complete self-sufficiency is growing. These recently disabled pa-

tients are of all ages, although older people predominate. The training of professional workers, including physicians, to render the specialized services required for these patients is expanding, but not fast enough to keep pace with the demand.

It is important to maintain the high quality of training and to broaden and improve the program whenever possible. It is apparent that the University and community demands for specialists in the various phases of rehabilitation are extensive and diverse. In a new area of medical specialty, there are obviously too few people to do the whole job, but this department is exerting every effort to contribute to this need.

There have been no major changes in the contributions to undergraduate medical teaching from this department. Of the three exercises regularly given, it is notable that two of them involve in a major way our affiliate, the Institute for the Crippled and Disabled. The elective quarter of the third year has been more popularly sought in the past year.

There have been six residents in training, a number which has allowed better organization of clinical experience, with a senior and junior fellow in each training area of the Medical Center. Two of the trainees complete their training this year: Dr. Lucille Tsu, who will remain on the staff as assistant medical director of the Institute for the Crippled and Disabled, with clinical duties also at Presbyterian Hospital and the College; and Dr. John A. Downey, research associate, who will continue research begun in his residency.

The postgraduate course in cerebral palsy was given twice in the course of this, its sixth year. A striking feature of these courses is the mature character of the student body and the fact that they come from all parts of the United States and many foreign countries. A survey of earlier graduates of this course indicates that a high percentage are utilizing their specialized knowledge in responsible positions in the cerebral palsy field.

Dr. Downey and Professor Robert C. Darling are studying the effects of salicylates in response to exercise. Dr. Shyh-Jong Yue is continuing at the Institute for the Crippled and Disabled to develop medical criteria for predicting vocational success among cerebral palsied patients. He also collected data and reviewed the experience with prostheses for hemipelvectomies. In collaboration with Dr. Alexander D. Papas of the Department of Orthopedic Surgery, he is reviewing their experience in the handling of prosthetic problems among elderly and complicated amputees.

Professor Darling has again collaborated with Professor Abraham Jacobs of Teachers College in a course on the medical aspects of disabilities and rehabilitation, primarily for vocational counselors. At the Institute for the Crippled and Disabled, Professors Darling and Jacobs are likewise collaborating in the fifth annual June workshop for various workers on the rehabilitation team.

The Affiliation Committee on Rehabilitation, with representatives from major areas in the University, the Hospital, and the Institute, has reviewed

in four meetings the rehabilitation activities in the University and its affiliates. Professor Darling is chairman of the committee and is also a member of the executive committee of the newly formed Conference of Medical Directors of Physical Therapy Schools. He participated in a panel on fatigue at the New York Academy of Medicine.

Professor William Benham Snow has been active on an advisory committee on classification of nomenclature and criteria in neuromuscular disabilities; this committee has been working in collaboration with the Office of Vocational Rehabilitation, the Association for the Aid of Crippled Children, and the National Committee on Vital and Health Statistics of the Surgeon General's Office in Washington. He has instituted a reorganization of clinical teaching of physical therapists in affiliation with the Presbyterian Hospital. He is a member of the American Registry for Physical Therapists and continues active with the New York City Board of Education classes for handicapped children.

Professor Morton Hoberman won commendation for an exhibit at a meeting in London of the International Society for the Welfare of Cripples.

Professor A. David Gurewitsch has moved his practice office into the Institute for the Crippled and Disabled, thereby becoming geographically full-time within the University's clinical facilities. He traveled extensively in Soviet Russia, visiting medical and other institutions and has lectured on his observations to numerous groups since his return.

OCCUPATIONAL THERAPY

Fifty-two students registered this year, of whom twenty-nine were in the academic program and twenty-three in clinical affiliation. Fifteen students received scholarship assistance this year from twelve different agencies. Six students completed requirements for the Bachelor of Science degree and seventeen for the certificate. Thirty-five students received clinical instruction in twenty-four hospitals or treatment centers. Members of the staff visited thirty-five hospitals or treatment centers at present utilized or contemplated for use in clinical instruction. A meeting of the Joint Occupational Therapy Student Affiliation Council of Columbia University, New York University, Richmond Professional Institute, and the University of Pennsylvania was attended by staff members and by representatives of eighteen affiliated clinical centers.

A continuation grant from the Office of Vocational Rehabilitation permitted, in addition to scholarship support, the continuation of the occupational analysis and prevocational evaluation course which this year was made available to advanced standing students as well as to seniors; the development of a laboratory course in activities of daily living; the final preparation and original distribution of a manual on woodworking techniques for occupational therapists by Miss Edith Brokaw; the preparation of a second manual by Miss Brokaw on decorative textile techniques for the occupational thera-

pist; the preparation and original distribution of a manual on prevocational evaluation by Dr. Jack Granofsky; greater liaison with clinical training centers; and the inauguration of an intensified recruitment effort directed by Mrs. Adelaide A. Deutsch, a newly appointed instructor.

Miss Geraldine Shevlin enrolled as a fellow of the National Foundation for Infantile Paralysis and is preparing for teaching and administration in an occupational therapy school.

Mrs. Isabel Robinault, supervisor of the postgraduate courses in cerebral palsy, is completing her doctoral requirements in developmental psychology at Teachers College. She is publishing a book in collaboration with Dr. Eric Denhoff of Providence, Rhode Island: *Cerebral Palsy and Related Disorders, a Developmental Approach to Dysfunction*.

Miss Eleanor Kille has joined the staff as an assistant in occupational therapy; Miss Elizabeth Scully, director of occupational therapy in Presbyterian Hospital, was appointed an instructor; and Miss Marguerite Abbott became director of professional education at the Institute for the Crippled and Disabled and was promoted from instructor to assistant professor.

In view of increasing costs, it has become important that scholarship opportunities be made available to occupational therapy students from University funds. Space for teaching and for a student lounge is badly needed as well as working space for fellows and staff other than administrative officers.

PHYSICAL THERAPY

The student body consisted of a total of forty-three full-time members and two part-time students. The latter were certificate students of the previous year who had not completed all requirements for certification. Approximately 60 per cent of the group came from liberal arts colleges, 40 per cent from universities.

A larger portion (51 per cent) of the students than ever before received partial or full scholarships. The greatest number (31 per cent) of scholarships were furnished by the National Foundation for Infantile Paralysis. An emergency fund recently given by the Physical Therapy Alumni Association for the use of students will be of further aid.

Applications for the certificate program continue approximately to double those for the degree program. Of forty-two total vacancies in the courses for 1958-1959, thirty were filled by mid-April.

Professor Mary E. Callahan and Miss Ruth Dickinson have been active in recruitment programs of their professional organizations, and have participated in the several national discussion groups plotting the future of physical therapy education, professional accreditation, and related subjects.

Physiology

EXECUTIVE OFFICER: Professor Magnus I. Gregersen

Dr. Werner R. Loewenstein, formerly on the faculty of the University of Santiago de Chile, joined the department as assistant professor in August. Dr. George R. Rowley, appointed instructor, took up his duties here in September. Dr. Shu Chien, instructor, has been advanced to assistant professor, and Miss Barbara A. Olson, who this year held a United States Public Health Service fellowship, has been advanced from assistant to instructor. Mrs. Patricia Farnsworth, who started her graduate work as a Lydia Roberts fellow, has been appointed an assistant. Mr. Edward Herzig, whom the Dental School selected for a United States Public Health Service post-sophomore research fellowship in physiology under the training program sponsored by the National Institutes of Health, served as assistant during the summer and fall. Dr. Sidney Socolar, assistant professor of mechanical engineering in the School of Engineering, has been appointed research associate in physiology. He has been working with Professor Victor Paschkis, associate professor of mechanical engineering, on analogue electronic computers. Members of this laboratory and Professor Hans H. Zinsser of the Department of Urology are collaborating.

A great deal of time and effort was devoted this year to adjustment of the content and schedule of the medical course in physiology to correlate with other courses in the first year and in the planning of the new curriculum for next year. A pilot teaching unit embodying modern electronic methods was set up during the fall and winter and used this spring by two groups of fifteen first-year medical students. The major responsibility for the selection of equipment and the design of the pilot laboratory was shouldered by Professors William Nastuk and William W. Walcott. The participants were enthusiastic about the advantages of the equipment and the changes made possible in the experiments by more exact methods of recording. Another notable improvement, initiated by Professor Walter S. Root, was the acquisition of twelve manometric Van Slykes which enabled the students to carry through experiments on blood gases with the same equipment used today in research laboratories and modern clinics.

Professor Root directed the dental course and Dr. Robert J. Dellenback was in charge of the administration of the medical course. Professor Nastuk will replace Professor Louis J. Cizek as departmental representative for the summer session when Professor Cizek goes on sabbatical leave on July 1. Professor Nastuk's contributions to the teaching of neurophysiology were

given recognition by the American Physiological Society which invited him to participate in the refresher course on neurophysiology given at the fall meetings of the Society in Iowa City.

The courses for students in physical and occupational therapy were given by Drs. Mero Nocenti and Richard Rowley. Various members of the staff, including Professor Cizek, Professor Walcott, Dr. Gerd Muelheims, and Miss Barbara Olson, gave lectures in the course for nurses. Dr. Rowley was in charge of arranging the schedule of the weekly departmental seminars. Professor Gregersen conducted a series of seminars on the survey and selection of literature best suited to give graduate students a rapid orientation in the history of physiology and philosophy of science.

Professor Loewenstein and his associates have been concerned primarily with investigations on the generation of nerve impulses in isolated Pacinian corpuscles with special emphasis on the mechanisms of mechano-electric conversion. Professor Loewenstein also collaborated with Professor David Nachmansohn of the Department of Biochemistry on the content and localization of acetylcholine in the Pacinian corpuscle.

Professor Nastuk spent his sabbatical leave during the fall mainly at the New York Academy of Medicine writing scientific papers and a portion of a monograph on neuromuscular blocking agents. He has recently been asked to be editor of two new volumes in a series of books dealing with physical techniques in biological research. Professor Nastuk has continued with investigations on the nature of the end-plate membrane permeability change produced by the reaction of this structure with acetylcholine. Professor Nastuk has also continued his studies on myasthenia gravis and undertaken a search for the presence of a neuromuscular blocking agent and for complement activity in the blood from pregnant myasthenic women and their newborn. With collaboration of Miss Olson, Professor Nastuk completed a study of structure-activity relationships with respect to the neuromuscular activity of tensilon and compounds closely related to it. Under the direction of Professor Nastuk, Miss Olson has embarked on a study of the action of strychnine at the neuromuscular junction. Professor Nastuk and Mr. Jack T. Alexander, electronic technician, have succeeded in developing a new, compact electronic square wave stimulator suitable for the student laboratory as well as for research. Mr. Leonard Levine, also working under the direction of Professor Nastuk, began electrophysiological studies on chronically denervated skeletal muscle.

Investigations on various aspects of radiation sickness and the effects of x-irradiation on the brain have been continued by Professor Gregersen and Dr. Pallavicini with the collaboration of Dr. Dellenback, Dr. Rowley, Dr. Chien, and others. Dr. Chien, with Dr. M. T. Peng, research fellow from the National Taiwan University Medical College, completed a study in dogs of the so-called "CNS death" produced by massive doses of x-irradiation to the head. Related studies on tissue respiration and intermediary metabolism in brain are being conducted by Drs. Dellenback and Rowley and Miss Alice

Rudolph. Dr. Rowley and Mrs. Farnsworth have undertaken a critical study of the distribution of water in the brain with micro-techniques. During February Dr. Chien attended the sixty-second session of radioisotope techniques at the Oak Ridge Institute of Nuclear Sciences.

Circulatory physiology also continues to be a major interest of this laboratory. Drs. Muelheims, Rawson, and Dellenback have followed up the earlier studies of Professor Gregersen on bleeding volume and determined the distribution of the blood remaining after total bleed-out in rats, using the Cr⁵¹ cell-tagging technique. Dr. Muelheims is now attempting the more difficult determination of distribution in the normal rat. Dr. Rawson with Drs. Chien, Peng, and Dellenback completed a study in splenectomized dogs of the residual volume necessary for survival. Dr. Chien, who undertook a definitive evaluation of the circulatory adjustment of splenectomized dogs to hemorrhage, has now initiated a study of the hemo-dynamics of the denervated circulation.

Professor Root and Mr. Herzig have explored the bone circulation in the cat and studied the control of bone marrow pressure by neural and humoral mechanisms. Professor Root and Dr. Chien have begun a study of the circulatory reflexes in the decerebrate cat. Dr. Rawson and Professor Gregersen have been collaborating in the preparation of a review on blood volume in health and disease and on factors regulating blood volume, to be published in the *Physiological Reviews*.

Dr. Nocenti has been engaged in the study of the acute and latent effects of diethylstilbestrol on ovarian function. Dr. Nocenti's specialized knowledge of the endocrines has made him a valued member of the staff.

Professor Cizek's long-term studies on factors controlling fluid intake and fluid metabolism have among other things been concerned with the mechanisms responsible for the occurrence of polydipsia and polyuria in salt deficiency.

A list of the department's publications from 1937 to 1957, totaling more than 450, was issued in booklet form in March of this year. The booklet also lists former members of the staff during this period and their present positions as well as those who received the Ph.D. in physiology under the Faculty of Pure Science with their present positions. The record reveals that support has been received from twenty-two private foundations and organizations as well as seven governmental agencies.

Professors Root and Nastuk have continued to be active in the New York State Society for Medical Research, and Professors Root and Walcott have been members of the Council of the New York Academy of Sciences. Professor Root was co-chairman of the Conference on Hematopoietic Mechanisms held in May under the auspices of the New York Academy of Sciences. He was recently made a member of the Advisory Screening Committee in the Medical Sciences for Fulbright Fellowships and also became a member of the Physiology Test Committee of the National Board of Medical Examiners. Professor Gregersen, who has for several years been a member of the Library

Committee of the New York Academy of Medicine, was chairman of one of the sessions of the special conference of over one hundred library experts convened by the Academy on March 29, at which definitive plans were formulated and positive steps taken to solve the urgent problems of space, services, and costs now facing all the medical libraries in the New York area. In December, at the invitation of the World Health Organization, Professor Gregersen attended the meetings in Geneva of a special WHO Study Group set up to consider a problem entitled "The Preventive Angle in the Teaching of Physiology."

Psychiatry

EXECUTIVE OFFICER: Professor Lawrence C. Kolb

Perhaps the major change in the teaching activities of the department brought about during the past year occurred with the reorganization of the Vanderbilt Psychiatric Clinic and the initiation of a full-time post of chief of clinic. Professor Robert B. McGraw, who has served as chief of the Vanderbilt Psychiatric Clinic with distinction since July 1, 1930, gave up his part-time position and was succeeded by Professor Robert Senescu. Professor McGraw continues to serve on the Executive Committee of the department.

The reorganization of the Vanderbilt Psychiatric Clinic coincides with major modifications in instruction of third-year medical students. Students are now given direct responsibility for the initial interview and study of patients admitted to the clinic. Students are supervised in groups of twos by members of the attending staff. In addition, a general clinical seminar has been arranged once weekly for the students. With the active participation of the student in the management of the patient and with the contribution of the resident staff in assisting in their training, the motivation of the student and the service to the patient has greatly improved.

The closing of the relationship between the Vanderbilt Pediatric Psychiatric Clinic and the Children's Psychiatric Services of the Psychiatric Institute has also made possible the active participation of the third-year medical students in the initial studies of the children and families referred for psychiatric consultation or treatment.

The student becomes acquainted with the interviewing of children and their parents, and obtains some experience in the clinical psychiatric evaluation of the child and an understanding of the dynamics of symptom formation as they derive from disturbances in parent-child relations. The evaluation of treatment needs is demonstrated and the student also learns of various community facilities that meet the needs of children.

In order to provide close teaching supervision, each instructor in pediatric psychiatry is assigned as preceptor of two or three students. The instructional group includes Professors William S. Langford and Benjamin H. Balser, and Drs. John P. Lambert, William A. Schonfeld, Raymond Sobel, Exie Welsch, Rodman Gilder, Jr., Soll Goodman, John Briggs, Marynia F. Farnham, Kathryn F. Prescott, Percy E. Ryberg, David E. Sobel, Virginia N. Wilking, and Elizabeth Huff. The senior resident on child psychiatry, Dr. Joanne Lloyd-Jones, has participated in the program of instruction since the beginning of October, 1957. As a part of the clerkship, Professor Donald Dunton has provided clinical demonstrations of the more severe psychopathologies seen in children.

In addition to the work of this instructional group the medical teaching has been supplemented by the contributions of Miss Elma Olson, psychiatric social worker of the Pediatric Psychiatric Clinic, and Miss Harriet Sternberg, psychiatric social worker of the children's psychiatric services of Psychiatric Institute.

In the group clinic Professor Bernard Holland has been assigned the responsibility for the psychiatric consultation service for fourth-year students. Under his leadership each afternoon two psychiatric consultants report to the group clinic and assist both students and attendants with the patients' psychiatric problems. On two afternoons a week conferences are held with the senior students who present for discussion a patient seen in the group clinic. Professor Holland, with Drs. Robert J. Weiss, and Soll Berl, have taught in these conferences.

On the invitation of the Department of Nursing, Professor Senescu and Dr. Weiss have conducted a weekly faculty seminar with staff members of the Department of Nursing.

A new affiliated psychiatric residency training program has been arranged with the New York State Department of Mental Hygiene. Ten selected residents on the level of second-year training, from the Rockland, Hudson River, and Harlem Valley State Hospitals are attending a program conducted in the mornings at Vanderbilt Clinic, and at the Psychiatric Institute in the afternoons. Drs. Daniel Shapiro, Alvin Polatin, John Cederquist, Horace DeWitt, and David Sobel, are now providing the didactic and supervisory instruction.

The training course for first-year residents from the downstate hospitals of the Department of Mental Hygiene was continued at the Psychiatric Institute. The course furnishes training in the basic sciences not available at the state hospitals.

The postgraduate courses in neurology and psychiatry, given under the joint auspices of the Departments of Psychiatry and Neurology, were held again during the fall. They were attended by thirty-one psychiatrists from the staffs of the various hospitals of the New York State Department of Mental Hygiene and other institutions in the United States.

Professor George E. Daniels has been appointed director of the Columbia Psychoanalytic Clinic, to succeed Dr. Abram Kardiner who is retiring.

The National Institute of Mental Health has provided funds for the sup-

port of a "field station" training program in clinical psychology and two pre-doctoral internships in clinical psychology. To aid in the development of this teaching program during the past year the facilities in clinical psychology in the Medical Center have been reorganized and integrated under the Department of Psychiatry. In conjunction with this reorganization, the division of clinical psychology of the psychiatric service of the Presbyterian Hospital now operates conjointly with the psychological services of the New York State Psychiatric Institute and the Psychological Training Program of the Department of Psychiatry under the direction of the senior clinical psychologist serving part time in each institution. As of February 1, 1958, Professor William N. Thetford was appointed to assume the responsibilities of this teaching program. Also, Louise Hewson was appointed associate in the department to aid in the new course of instruction.

In keeping with the growing awareness of the importance of instruction in the outpatient department and its relations with community agencies as the focus for preventive and therapeutic psychiatry, the inauguration of the Columbia-Washington Heights Mental Health Project is worthy of note. This project, a collaborative venture between the Department of Psychiatry and the School of Public Health and Administrative Medicine, has as its aims the survey and characterization of a demarcated urban community of 100,000 to 150,000 population (Washington Heights) surrounding the Columbia-Presbyterian Medical Center in terms of the prevalence of mental illness and emotional maladjustments known to the medical profession and to the community's many agencies and organizations; identification of mental health resources available to this population group, and the degree to which known needs are being met or could be met; determination of the attitudes of the community toward mental health and illness and identification of potential leaders for community mental health programs.

To carry out the project, Professor Viola Bernard has been designated director of a division of community psychiatry in both the School of Public Health and Administrative Medicine and the Department of Psychiatry. The research team brought together for this project consists of Professors Bernard and Margaret Barnard, Dr. Bruce Dohrenwend, and Miss Barbara Kohlsaet.

The faculty was saddened by the death of Dr. Lawson G. Lowrey. His distinguished contributions to the field of child psychiatry and mental health and his qualities as an understanding clinical teacher endeared him to his colleagues and students over the many years of his service.

Professors Abram Kardiner and David Levy retired at the end of the previous academic year and were reappointed lecturers, to continue their outstanding teaching contributions. Drs. Henry Brill and Henry Davidson have joined the department and are active in the instructional programs.

The following faculty members resigned during the year: Drs. Max Cohen and Joost A. M. Meerloo, associates; Drs. John A. Frank, Janet Kennedy, Eda L. Priest and Charles W. Socarides, instructors; Howard Sachs, research associate (Biochemistry); Hans G. Furth and Bernard Roth, assistants;

George L. Lake and John J. Levbarg (retired), assistant psychiatrists, Vanderbilt Clinic. The faculty wish to express their respect and appreciation for the contributions to the department.

During the year the following investigations were under way. Professor Franz J. Kallmann and his associates extended their interest to the areas of biochemical and radiation genetics in view of the widely increased interest and recent technical advances in the biological sciences converging on the genetic problems of mental health and disease in families and populations. The following longitudinal twin study projects related to the psychogenetic aspects of human behavior were carried on by this research team: senescent twins; early total deafness; emotional disturbances in the deaf; special types of mental defect—childhood schizophrenia, presenile brain atrophy, and other neurological disorders.

Professors Lawrence C. Kolb and Arthur C. Carr, with Drs. John D. Rainer and Alan Mesnikoff, have initiated a study of discordant psychosexual development in identical twins.

Professor Carney Landis and his associates have continued their attempt to relate simple psycho-physiological test measures to the efficiency of brain function utilizing the flicker-fusion threshold, choice reaction time, and speed of tapping. Attempts to measure the auditory threshold to high frequency tones (over 10 KC) by a new method involving magnetic driving of a very small magnet attached to the eardrum are being investigated with some success. The induction of visual phosphenes by magnetic fields is also being pursued.

Professor Warren M. Sperry has continued his studies of brain unsaponifiable lipides. Professor Herbert L. Meltzer has succeeded in separating some of the components of the proteolipide and ganglioside fractions of brain lipides by use of his three phase counter-current fractionation method. Professor Benjamin Weiss has developed a new method for the synthesis of N-acyl derivatives of sphingosine and dihydrosphingosine.

Professor Heinrich Waelsch with Dr. Amos Neidle continued the studies of the biosynthesis of histidine. With Drs. Mary Mycek, Doris Clouet, Donald D. Clarke, the amine incorporation system recently discovered in this laboratory was investigated in detail. The chemical and biological implications of these findings are now under intensive study. Professor Abel L. Lajtha, with Dr. Berl, has continued the study of protein synthesis and turnover in the central nervous system and peripheral nerve. He is also studying with the aid of labeled amino acids the rejuvenation of the pool of free amino acid of the brain. The pool of free amino acids of the brain is replaced by amino acids from the blood stream at a rapid rate.

As a follow-up of previous studies on comparative histologic and electron-microscopic studies of the central nervous system in normal rats, guinea pigs, and macacus rhesus monkeys, Professor Leon Roizin, in collaboration with Professor Mavis Kaufman and Mr. Milton Kranitz, have observed remarka-

ble pleomorphism and numerical variations of mitochondria within neurons, neuroglia, axons, myelin sheath, and neuropile.

Professors Roizin and Kolb, in reporting on the neuropathologic relationship of multiple sclerosis to the experimental allergic encephalomyelitides at the First International Congress of Neurological Sciences and the Third International Congress of Neuropathology, emphasized that of the various demyelinating processes thus far reproduced in laboratory animals the E.A.E.M. appears to have closer clinical as well as neuropathological similarities with the acute and chronic varieties of human M.S. and, in particular, with the postvaccinal, postexanthematous, and certain postinfectious encephalomyelitides, and that some of the inflammatory reactions observed in human material may be considered also as the result of a process of iso- or auto-sensitization.

Professors Bernard C. Holland and Perry B. Hudson and Drs. Michael E. Lombardo and Leon Lefer of the Department of Urology have collaborated on a clinical and chemical study of adrenal function in schizophrenic patients. Professor Holland, Dr. Cohen, Professor Marcel Goldenberg of the Department of Medicine, and Dr. Lefer have collaborated on a study of adrenalin and nor-adrenalin metabolism in normal subjects and in schizophrenic patients. Also Professor Holland, with Dr. Lefer, initiated a study of porphyria relating longitudinal psychiatry to chemical processes. Dr. Kenneth Sterling has begun an investigation of thyroxin turnover, total thyroid pool, and erythrocyte uptake of triiodothyroxine in healthy individuals and schizophrenic patients. Professor Holland, with Drs. Bernard Schoenberg and J. Schulman, have participated in a study of ward structure and function, that is, the therapeutic and anti-therapeutic factors in the social structure of a psychiatric ward.

Dr. Lenore Kopeloff has under investigation various methods for inducing the convulsive state in animals. The epileptic status of each animal now has been followed for one to two years with observation of clinical seizure responses induced by prodding or activation by critical challenge doses of intramuscular metrazol and picrotoxin, electroencephalographic abnormalities, and histopathologic examination. Alumina cream-induced epilepsy in infant monkeys is still under investigation with Professor William F. Caveness of the Department of Neurology. Dr. Joseph G. Chuside of St. Vincent's Hospital has collaborated in the above projects.

Dr. Sidney Malitz and his co-workers have continued their investigations on the evaluations of new pharmacological agents. A number of new phenothiazine derivatives and other tranquilizing agents have been or are in the process of being evaluated.

Dr. Malitz and Professor Leon Roizin are working on the simultaneous evaluation of behavioral and toxic effects of psychopharmacologic agents in patients and experimental animals. Dr. Magdalena Berger, in collaboration with Dr. T. Forrest of the Veterans Administration Hospital in Brockton,

Massachusetts, has developed a method for estimating chlorpromazine in animal tissues.

Dr. Murray Glusman, in collaboration with Professor Joseph Ransohoff of the Department of Neurological Surgery, has been implanting electrodes in the hypothalami of cats and eliciting behavior responses by direct stimulation. Determinations of the effects of pharmacologic agents on these responses are proceeding satisfactorily.

Dr. Reginald Taylor, with Professor Sperry, has studied dimethylaminoethanol (DMAE), a precursor of acetylcholine, occurring naturally in brain.

Professor Hilde Bruch continued the study of obesity by follow-up observations on former child patients. She has reported the findings in book form. She also made systematic observations on the interaction of psychotherapy and medical management in serious cases of anorexia nervosa in adolescents and adults. In addition, she continues a study of the teaching of emotionally disturbed children.

Dr. David Sobel is studying the longitudinal development of children with two schizophrenic parents.

Professor Leon Moses continues his research studies, in collaboration with Professor Edmund Goodman of the Department of Surgery, on a series of peptic ulcer patients, and also his other studies in the fields of obesity and essential hypertension.

With the cooperation of Professors William Seaman and Morton Kligerman and Dr. Norah Tapley of the Department of Radiology, and with the assistance of Professor Arthur C. Carr, Dr. Judith Schachter and Dr. Bernard Schoenberg, Professor Senescu has been studying the emotional responses of patients to neoplastic disease in the radiotherapy clinic.

Dr. Weiss, with the aid of Professor Carr and Dr. Schoenberg, and in conjunction with the Department of Dermatology, is engaged in a project which aims to determine which patients with neurodermatitis are responsive to brief directed psychotherapy.

Dr. Joseph Schachter is developing equipment and plans for an investigation of the physiological study of newborn infants, as part of a longitudinal study of emotional behavior.

Among the staff of the Columbia Psychoanalytic Clinic, Dr. Kardiner and Professors Aaron Karush and Lionel Ovesey have initiated a critical examination of Freud's original psychological concepts that developed from his investigations into the causation and the nature of dreams.

Professors Daniels, Karush, and Senescu are engaged in a follow-up study of ulcerative colitis. This project entails the study of patients treated psychoanalytically, patients treated by psychoanalytically oriented brief psychotherapy, and some who were treated at the ulcerative colitis clinic in a Vanderbilt Clinic without psychotherapy.

Professor Karush, with Professor Barbara Easser, Dr. Arnold Cooper, and Mrs. Bluma Swerdloff, is attempting to identify in the initial interview those

psychological items of behavior which, taken as a whole, are evidence of what is loosely described as "ego strength."

A pilot study on recording psychiatric data has been undertaken by Dr. H. Lee Hall, Dr. Shapiro, and Professors Nathan Ackerman and John J. Weber. It is felt that this could also prove a useful teaching method.

An evaluation of selection procedures for candidates at the Psychoanalytic Clinic is under study by Professors Henriette Klein and Joseph Zubin and Drs. David M. Levy and Eugene Burdock.

Professor George S. Goldman, with Dr. Shapiro and Dr. Alvin Polatin, has undertaken a pilot study of the impact on the analytic process of presenting the patient in person to group conferences. Professor Klein is studying changes occurring in patients during psychoanalytic treatment. Dr. Joseph Lubart is preparing research material derived from a study on a group of nontoxic goitre patients seen in the thyroid clinic.

Professor Joseph Zubin, in collaboration with Drs. Eugene I. Burdock and Samuel Sutton, is continuing to investigate the problem of prognosis in the mental disorders by a variety of methods ranging from the physiological through the sensory, perceptual, psychomotor, and conceptual levels. A study has been completed comparing the premorbid characteristics of residents in a home for the aged who had to be hospitalized with those who were not hospitalized. A technique for gauging the effectiveness with which patients can shift their response from one sensory input to another has been developed. A retrospective analysis of the candidates for admission to the Psychoanalytic Clinic for Training and Research has been completed in which some of the admission tests were found to be predictive of success in the clinic.

Collaboration is continuing with Dr. Otto Lowenstein of the Department of Ophthalmology in pupillographic research and with Professor Edmund P. Fowler, Jr., of the Department of Otolaryngology in delayed auditory feedback.

Professor Zubin continued his teaching of experimental abnormal psychology and advanced abnormal psychology to graduate students of Columbia University. As a result of the international survey of biometric research conducted last summer with the help of the Commonwealth Fund, plans for an international work-conference on epidemiology of mental disorders were formulated.

AT MT. SINAI HOSPITAL

Dr. Charles Fisher has investigations in progress in conjunction with Drs. I. H. Paul and Stanley Friedman on the phenomenon of subliminal registration, postulated as taking place in the dream and imagery experiments; an investigation of altered states of consciousness with special reference to the possibility that such may enhance the emergence of subliminal registrations into consciousness.

AT ROCKLAND STATE HOSPITAL

Professor Nathan Kline has been studying the effects of meprobamate on affective states and states of regression. Perceptual differences between schizophrenics and controls in respect to the constancy hypothesis were studied by Dr. Louis P. Carini and Patricia F. Carini. Dr. Yasuhiko Taketomo examined tryptophan and indole metabolisms in the psychoses.

AT CREEDMOOR STATE HOSPITAL

Professor John Whittier is conducting a long-term study of the prophylactic use of anticoagulants in older first-admitted psychotic patients, and an experimental study of the function of certain basal nuclei of the brain.

AT THE MANHATTAN STATE HOSPITAL

Dr. Herman C. B. Denber has under way studies on the dynamics of abnormal behavior using drugs as a vector; the influence of various psychotropic drugs on the Funkenstein Test; the clinical effectiveness of new pharmacological compounds. An extensive study of a "therapeutic community" is now in operation.

Members of the faculty were honored during the year by various appointments and presentations. Professor Langford was inducted as president of the American Academy of Child Psychiatry in May, 1957. He was elected a trustee of the Joint Commission in September, 1957. Professor Paul Hoch was elected a fellow of the New York Academy of Sciences and also received in June, 1957, the Samuel Rubin Award. Professor Kline received the Albert Lasker Award of the American Public Health Association for 1957. Professor Bernard L. Pacella was awarded the Cavaliere Ufficiale dell'Ordine al Merito della Repubblica Italiana in January, 1958, by the Italian Consul General in New York on the part of the Italian Government.

Professor Kolb was appointed director of the Institute for Research in Mental Retardation of Columbia University. He was elected a fellow of the New York Academy of Sciences, chairman of the Section of Psychoanalysis of the American Psychiatric Association, and councilor of the New York Society for Clinical Psychiatry. He was appointed special consultant of the Department of Health, Education and Welfare, and chairman of the Committee on New Training Facilities of the American Psychoanalytic Association. He delivered the Edward T. Gilbson Lecture at the University of Kansas Medical Center and the Alpha Omega Alpha Lecture at the University of Oklahoma Medical Center. He also served as visiting professor at Wayne University.

Professor Ruth Moulton was elected president of the William Alanson

White Psychoanalytic Association. Professor Kallmann received an honorary M.D. degree from the University of Turin in June, 1956.

The faculty has received numerous appointments to direct clinical facilities and contribute to important community agencies. The members of the department presented the results of their work in numerous publications, addresses and lectures, both here and abroad, throughout the year.

During the year the department received visitors from Japan, Ecuador, Holland, Italy, Indonesia, Russia, Australia, France, and England.

The Sandor Rado guest lecturer this year was Dr. Franz Alexander.

Public Health and Administrative Medicine

EXECUTIVE OFFICER: Professor Ray E. Trussell

Since many of the concerns and responsibilities of the School of Public Health and Administrative Medicine are with community problems in a wide variety of health needs and services, we are dependent on the cooperation of many operating agencies, both official and voluntary, for making effective teaching possible. There is no way to adequately compensate these agencies or to give complete recognition to their contribution to our educational program. Without this pleasant and constructive partnership between the School and the community our educational and research programs would be seriously hampered.

The faculty and executive officer wish also to take this occasion to express to the Dean of the Faculty of Medicine their deep appreciation for all he has done to support the development of the School of Public Health and Administrative Medicine. Without this interest, encouragement, guidance, and support the accomplishments which have been a matter of record would never have taken place.

The School has continued to expand its research programs and to complete several described in previous reports. Two and a half years of work for the Joint Legislative Committee on Health Insurance Plans of the New York State Legislature were completed by April 1. During this period of time several important studies were completed, and some corrective legislation occurred as a direct outgrowth of data developed by Mr. Frank van Dyke and his staff.

A continuing program of studies of the quality of medical care under

different organizational patterns is being carried on by Dr. Milton C. Maloney with Professor Jack Elinson serving as consultant. During the past academic year a study was made of what physicians do for themselves and their families regarding the medical care, hospitalization, and other health services they need. Editorial support for the study appeared in the medical society *Journal* and *Newsletter* of the state society concerned and was most helpful in securing acceptance of participation in the study.

Under the general supervision of Professors E. Dwight Barnett and Ray E. Trussell, a two-year review of hospital-physician relationships and prepayment principles as they affect the quality of medical care was climaxed by a four-day conference in Princeton, during which approximately thirty national experts discussed the entire subject and contributed a very worthwhile set of proceedings.

The pilot study of medical care utilization under collective bargaining agreements for the Foundation on Employee Health, Medical Care and Welfare conducted in the Greater New York area was completed and reported to the Foundation. A national study based on the pilot inquiry will extend over a two and one-half year period. It is carried on by Dr. Josephine Williams under the direction of Professor Trussell and with Professor Elinson serving as consultant.

A short-term intensive preliminary survey of medical care in Puerto Rico was completed by a faculty team including Professors Harold Baumgarten, Elinson, George Rosen, Trussell, and Mr. Frank van Dyke. The report of the faculty study team to the Health Department of Puerto Rico and the Governor was the basis for legislation now pending to authorize the School to share in a two-year all-inclusive study of medical care in Puerto Rico which will provide the government with a basis for making certain policy decisions.

The School also has been retained by the Union Family Medical Fund of the Hotel Industry of New York City for consultation in establishing a medical care program and for a two- to three-year period of evaluation of the program after it is established. This work will be carried on by Miss June Sachar under the general direction of Professor Trussell and with Professor Elinson serving as consultant.

A review conducted by the School for the Interdepartmental Health Resources Board of New York State of the narcotic treatment program of the Riverside Hospital has been extended in order to secure more information regarding the patients who are handled under the Riverside Hospital program. This work is being done under the general direction of Professor Trussell and Professor Elinson by Mr. Harold Alksne. It consists at the present time of attempting to establish the status of 247 addicts admitted to the program in 1955.

The Alumni Association of the School has been increasingly active. Meetings are held at the American Public Health Association and the American Hospital Association, where the executive officer and the president of the

association report to the alumni. Professor Harold Baumgarten, Jr., now serves as executive secretary for the Alumni Association. The development of this group as a reciprocal channel of communication and assistance is most gratifying, and the executive officer wishes to take occasion to thank Mr. Irving Gottsegen, who served as president of the Association and Dr. Arthur Robbins, who has become president of the Association for the current year.

Professor Trussell completed his term of service as vice-chairman of the Council on Hospital Planning of the American Hospital Association and as chairman of its Committee on Hospital Planning. He also completed his term of service as chairman of the Council on Community Service and Education of the American Heart Association.

He was appointed to the Committee of Professional Education of the American Public Health Association, to the Advisory Committee to the National Health Survey conducted by the United States Public Health Service, and was elected vice-chairman of the Association of Teachers of Preventive Medicine.

Miss Louise Gerold, administrative assistant, deserves special consideration for her excellent and capable services to the School. We also wish to commend friendly and capable clerical, secretarial, and technical staff who make so much of our work possible. The services provided by the City Health Department for the maintenance of our educational and research facilities deserve special mention also.

DIVISION OF BIOSTATISTICS

The teaching activities of the division were similar to those of previous years insofar as the public health students were concerned. The first course, introduction to vital statistics, was given to all students of the School of Public Health, a total of ninety-two students. The course in the elements of statistical analysis was attended by forty-eight students. The lectures were given by Professors John W. Fertig and George L. Saiger. The course in life table methods as applied to chronic diseases, taught by Professor Agnes P. Berger was given to thirteen students, a number of whom were Master of Public Health candidates. The teaching staff was greatly strengthened by the appointment of Mrs. Phyllis B. Michelsen as instructor in biostatistics.

Professor Saiger gave a series of fourteen lectures and problem assignments to medical students in the first year. He has revised the syllabus of notes used in the course. He also participated in the organization of several of the teaching exercises used by the Department of Physiology. The division gave six lectures as part of the third-year course in preventive medicine.

The activities of the division in the training of biostatisticians have been intensified. Three students were supported by the training grant from the United States Public Health Service and carried on advanced graduate work in biostatistics. In addition, twelve other students were candidates for

degrees in biostatistics, two of them for the Master of Public Health degree. There were eight statisticians from the New York City Health Department taking one or more courses. The division also gave some additional training to the epidemiology trainees. The students participated in laboratory instruction in various courses as well as in the numerous consultations of the division in the Medical Center.

Professor Fertig and Mrs. Michelsen, assisted by Mr. Robert Israel, gave a short intensive course on medical statistics to a group of physicians in occupational medicine as part of the School's program of continuation education.

Professor Berger has continued her research on appropriate methods of evaluating follow-up data, and with Professor Fertig and Mrs. Ruth Gold studied the applicability of sequential techniques to medical research. Professor Fertig has continued his collaboration with Dr. Neal Chilton on statistical methods in dental research, and has continued work on methods for assessing the results of repeat experiments. Professor Saiger has been working on bioassay techniques, the applicability of certain multivariate techniques to medical research, and has continued prior research on the biological effects of radiation.

The division has participated in approximately one hundred consultations to the research workers of the Medical Center and of the New York State and City Health Departments. Some of the projects with which it has been more closely associated have been the studies of Professor Shih-Chun Wang of the Department of Pharmacology on bioassay, Professor Conrad M. Riley of the Department of Pediatrics on nephrosis, Professor William A. Silverman of the Department of Pediatrics on premature infants, Professor Alfred Gellhorn of the Department of Medicine on carcinogenic agents, the New York State Health Department on arteriosclerosis, the New York City Health Department on hepatitis, Professor Nathan S. Kline of the Department of Psychiatry on the effects of estrogenic substances in arteriosclerosis.

Professor Fertig continues as a member of the Advisory Committee on Epidemiology and Biometry of the United States Public Health Service. He spent two months in South America under the auspices of the World Health Organization visiting various medical centers to see what research activities necessitated statistical advice and to see what steps were being taken to meet the shortage of statisticians. He and Professor Saiger also participated in a panel discussion for medical statistics for the New York State Society of Anaesthesiologists.

DIVISION OF COMMUNITY PSYCHIATRY

The Division of Community Psychiatry was officially established during the past academic year and has responsibility for all activities in the School pertaining to the field of community psychiatry, administrative psychiatry, mental health, and similar areas. Professor Lawrence C. Kolb of the De-

partment of Psychiatry also established a Division of Community Psychiatry within his department. Professor Viola Bernard of the Department of Psychiatry serves as head of both divisions and directs the joint program which has been developing for the past three years.

These joint activities consist mainly of three major undertakings which are becoming increasingly interconnected: the administrative psychiatry program, the combined traineeship program, and the Columbia-Washington Heights Community Mental Health Project. The project is essentially concerned with studying mental health problems in the area around the Medical Center, particularly as they relate to the issues of the occurrence of mental illness and community facilities available for their correction, and the investigation and planning of therapeutic health procedures to correct them. Offices for the project have been established in the Psychiatric Institute. Professor Bernard serves as director of the project under the general supervision of Professors Kolb and Trussell. A staff has been assembled consisting of Professor Margaret W. Barnard, Miss Barbara Kohlsaatt, and Dr. Bruce Dohrenwend. Several others participate on a part-time or short-term basis, including a biostatistician. Dr. Robert J. Weiss of the Department of Psychiatry will join the project in June, 1958. Professor Elinson, Dr. Ernest Gruenberg, who is assigned to the Division of Epidemiology by the Department of Psychiatry, have both participated in the development of the project. Representatives from various community agencies such as the City Health Department are also involved in planning and developing the study.

The administrative psychiatry and combined traineeship programs have become increasingly integrated. In September, 1957, two additional candidates for administrative psychiatry were enrolled and at the beginning of the Spring term the three psychiatrists who had first started in this program in 1956 returned from their residency experience and are completing their academic year. In addition, two more psychiatric residents were admitted for a combined traineeship program leading to completion of formalized psychiatric training and the Master of Public Health degree or the Master of Science degree in administrative medicine. One of these physicians is from Puerto Rico, to which he will return to work with the health department in their mental health program.

Assisting Professor Bernard in the development and administration of a curriculum for the eight psychiatrists involved in various cooperative programs have been Mrs. Mildred B. Beck, Miss Mildred C. Scoville, and Miss Sally Knisely. The main work of the academic year has been to devise, organize and carry out these curricular changes and to meet the many problems natural to such new and complicated ventures.

During the academic year Dr. Mottram Torre became assistant director of the World Federation for Mental Health and is developing an epidemiological study for that organization.

In addition, an evaluation of the teaching of mental health in public

health has become of increasing interest. The School is taking the initiative in establishing a national study of this problem and plans are well under way for a national conference involving the accredited schools of public health, departments of psychiatry from selected universities, and field agencies of a variety of types in an effort to assess what has been accomplished so far and what needs to be done in the teaching of mental health to generalized public workers and in the development of specialists within the field.

THE DIVISION OF EPIDEMIOLOGY

The principal changes in the educational program of the division have been in the extension of the required teaching for public health students over three-fourths of the academic year in order to bring about an integration of teaching and to introduce new content, particularly on the chronic diseases. The other new activity which has been put into operation during the past academic year is the traineeship program for epidemiologists. Three trainees (two physicians and one sociologist) have begun extensive training for a career in epidemiology.

The division members have been active also in developing epidemiological studies of the cardiovascular diseases, drawing in part on the productivity of a committee composed of faculty and community organization personnel and in part on the past interests and the traineeship program potential in the division. Studies have been completed of the venereal disease problems in the United States and of differential coronary artery disease mortality rates in areas of New York City. The latter investigations are being continued for New York State.

Professor E. Gurney Clark, head of the division, has served as co-author of a completely revised textbook, *Preventive Medicine for the Doctor in His Community*, in cooperation with Professor Hugh Leavell of the Harvard University School of Public Health.

The addition of Dr. Ernest M. Gruenberg to the faculty on a formalized part-time basis has made possible the reactivation of teaching in the epidemiology of mental disorders and the development of regular weekly conferences on mental health research. The conferences were attended by faculty members, trainees, and special guests.

Professor Clark has served as chairman of a committee of the American Public Health Association on the teaching of epidemiology. He attended the World Health Assembly in Minneapolis as a delegate for the International Union Against Venereal Disease and Treponematosis. He was reappointed to the Expert Advisory Panel on Venereal Diseases and Treponematoses of the World Health Organization and became a member of the Committee for Continuation Education of the New York State Academy of Preventive Medicine. He serves as a consultant to the American Board of Preventive Medicine and was chairman of the Membership Committee of the American

Epidemiological Society. He also served as a member of the Committee on Local Health Services of the National Health Council and of the Subcommittee on Communicable Disease Control of the Committee on Evaluation and Standards of the American Public Health Association. Professor Clark has also served as medical consultant to the American Social Hygiene Association, and as epidemiological consultant to the Health Information Foundation.

Professor Morton Schweitzer served as a member of the Tuberculosis Control Committee of the New York Tuberculosis and Health Association. He became chairman of the West Side Chamber of Commerce Committee on Health, Education and Welfare, and president of the newly-formed Upper West Manhattan Neighborhoods Association.

DIVISION OF HEALTH EDUCATION

Professor George Rosen assumed full-time academic status at the beginning of the year. Since then he has been able to devote more time to the development of several aspects of the School curriculum, serving as chairman of the Orientation Course Committee and as chairman of the Curriculum Committee for the second semester.

More emphasis is being given in the School to measurement methods using the social sciences and related techniques. A course on surveys and polls, previously offered as an elective, became a required course for all public health students. A cooperative effort between Professors Rosen and Elinson, was developed early in the curriculum to introduce some understanding of how social sciences can be useful in public health.

Professor Rosen also served as the program chairman for the development of an experimental short course for executives of voluntary health agencies in local communities. The course is being developed in conjunction with the American Heart Association and the American Cancer Society under the aegis of our program of continuation education.

Beginning January 1, 1958, Professor Rosen became the director of a three-year study of public health and the social sciences financed by the National Institute of Mental Health and sponsored by the American Public Health Association. He also became the editor of the *American Journal of Public Health* and completed a chapter, "Health Programs for an Aging Population," which will form a part of a *Handbook on Social Gerontology* which is being written under the auspices of the Department of Health, Education and Welfare. He continued to serve as a member of the Medical Advisory Board of the Sidney Hillman Health Center and became a member of two committees of the Community Council of Greater New York—one concerned with prepayment financing of medical care for psychiatric illness, the other with prepayment for nursing service. He continued as a consultant in health education to the Professional Examination Service of the American Public Health Association and as chairman of a committee to

study the library of the New York Academy of Medicine. He also accepted appointment as chairman of the section on Medical History of the Southern Historical Association.

DIVISION OF MEDICAL CARE ADMINISTRATION

It is with regret that we report the resignation of Professor E. Dwight Barnett in order that he could accept the directorship of the Stanford University-Palo Alto Medical Center. His six years of service at Columbia University were marked by many constructive changes.

The course in hospital administration, which will continue to retain the excellent features developed by Professor Barnett, will be directed jointly by Professors Trussell and Clement Clay. The successful experience of the preceding year was repeated when one or two students were assigned to each of seventeen hospitals as administrative clinical clerks for one day each week during the first semester. In each hospital an administrative resident from Columbia University or a member of the administrative staff serves as coordinator of the program.

With the reorganization of the division, Professor Elinson, Mr. Frank W. van Dyke, Professor Harold Baumgarten, Jr., and Professor Rosen became full- or part-time members of the division, complementing the already full-time faculty including Professor Clay and Dr. Magda P. Shorney.

Certain teaching innovations have been utilized in the division's program in the past year. The use of case studies developed by Mr. George Billington has continued; a course in planning and construction of hospitals has been further developed, including participation by a hospital architect and by several guest lecturers from agencies such as those responsible for the Hill-Burton program; a new course on the role of the administrator has been developed and coordinated by Professor Baumgarten; and extended content in medical care has become a required part of the curriculum for all students in the School. Professor Rosen has been principally responsible for developing this added work.

Under the sponsorship of the W. K. Kellogg Foundation, a three-year exchange professorship in hospital administration between Columbia University and the University of São Paulo, Brazil, has been established. Professor Barnett was the first visiting professor to spend two months at the University of São Paulo. Professor Clay will be in Brazil during the summer of 1958. In turn, Dr. Odair P. Pedroso, professor of hospital administration at the University of São Paulo, was at Columbia University in December and January.

Until his departure from Columbia at the end of January, Professor Barnett continued to serve as a member of the Board of Trustees and of the Master Plan Committee of the Hospital Council of Greater New York; as a member of the Board of Trustees of the Health Insurance Plan of Greater New York; as chairman of the Committee of Planning of Institutes,

financed by the Kellogg Foundation and sponsored by the Association of University Programs in Hospital Administration; and as a member of the National Advisory Committee for the Hospital Administration Research Study of the Association of University Programs in Hospital Administration. He was also appointed chairman of the newly created Council on Research and Education of the American Hospital Association.

Dr. Shorney has completed a two and one-half year study of convalescent care in convalescent homes in the greater New York area which has been conducted under triple sponsorship formalized through a committee representing the United Hospital Fund, the New York Academy of Medicine, and the Hospital Council of Greater New York.

Professor Clay was appointed a member of the Regional Committee of the American College of Hospital Administrators and of the Planning Committee for this year's New York Institute of the College for Hospital Administrators. He has continued to serve as an advisor to the Department of Personnel of the New York City Civil Service Commission; he has been a member of the Joint Committee of the Association of University Programs in Hospital Administration and of the Blue Cross Commission which has been developing instructional material for the various university courses.

Professor Elinson has served during the past year as a member of the Master Plan Committee of the Hospital Council of New York, a member of the Technical Review Committee on Research Grants for Epidemiological Studies of the American Heart Association, and a member of a similar committee for the New York Heart Association. He also served as a member of the Ethics and Standards Committee for the American Association of Public Opinion Research and is a member of the Research and Publications Committee of the New York City Health Department. He participated in a symposium on psychology and public health at the annual meeting of the Eastern Psychological Association in Philadelphia.

Professor Elinson also inaugurated two new seminars, one on research problems in administrative medicine and one on application of social science technique to research in public health and administrative medicine.

The W. K. Kellogg Foundation has extended its support of the project on selection of hospital administrators for an additional two years. This work is being carried out by Dr. Ruth Heiser. Twelve of the nineteen universities in the United States and Canada which have programs in hospital administration have administered the project's experimental selection battery to their students who are entering the program this year; and it is expected that they will also give the end-of-program materials developed in connection with the project.

During the year Mr. Raymond P. Sloan joined the faculty as adjunct associate professor of administrative medicine and will devote special attention to further development of certain areas of the curriculum, particularly in relation to trustees.

DIVISION OF OCCUPATIONAL MEDICINE

The principal change in teaching over preceding years has been the recognition on the part of the faculty that the public health aspects of radiation are of sufficient importance to all members of the student body that the course in public health aspects of radiation has been made a required course. The division also assumed the responsibility for reorganizing the fourth-year course for medical students in forensic medicine and medical jurisprudence. Professor David Spain of the Department of Pathology and Dr. Sidney Weinberg assumed the responsibility for the lectures in forensic medicine. Mr. Benjamin Werne has continued to present the material in medical jurisprudence.

The division cooperated with the program of continuation education by presenting a twelve-hour institute in industrial toxicology in February. This was offered to full-time physicians in industry through the American Academy of Occupational Medicine and was attended by eighteen physicians. The division has also prepared a home-study course in industrial toxicology for the American Academy of Occupational Medicine. About fifty physicians have enrolled for this work to date.

A new research project on work performance of epileptics is being conducted by Dr. Melvin M. Udel with assistance from Professor Melvin D. Yahr of the Department of Neurology. A study of the work performance of cardiacs with congestive failure is also being continued, and the first stage of a long-range study of workers exposed to mercury vapor has been completed and plans developed for a continuation of this work.

Professor Leonard J. Goldwater spent approximately three months in Alexandria, Egypt, as visiting professor of occupational health at the High Institute of Public Health. This mission was sponsored by the World Health Organization.

Professor Irving R. Tabershaw served as president of the American Academy of Occupational Medicine during the past year and Professor Goldwater was elected vice-president, having served as secretary for the preceding seven years.

DIVISION OF PARASITOLOGY

In the School of Public Health and Administrative Medicine basic instruction in various phases of parasitic diseases is integrated into the course in epidemiology. A number of elective courses in parasitology, medical entomology, and tropical diseases are also offered. This year at the request of a number of public health students clinical discussions and ward rounds were held on patients with tropical diseases in Babies Hospital, Presbyterian Hospital, and the Neurological Institute. Several students from tropical countries were given aid with medical and public health problems of special interest to them.

In the medical school, in keeping with our philosophy of enriching "pre-clinical" courses with clinical material, patients with malaria, amebiasis, ascariasis, hookworm, trichiniasis, echinococcosis, and schistosomiasis (this patient also had far-advanced leprosy) were presented to the second-year class in parasitic diseases. Professor Harold W. Brown continued his active participation in third- and fourth-year student and staff instruction in clinics, ward rounds, clinical pathological conferences, and several hundred consultations on patients with parasitic diseases. Professor Brown also participated in the course in practical therapeutics given by the Department of Medicine.

Five fourth-year students took their clinical electives in the Firestone Plantations Hospital in Liberia and the Aluminum Company of American Hospital in Surinam under the direction of Professor Brown. The students serve as interns in the hospitals and also carry out research of relevance and value to the country. This program of "medicine in the tropics" has gained national recognition and medical students from a number of schools have sought participation in it. Arrangements were made for two second-year students to take a pathology elective under Dr. C. M. Johnson, director of the Gorgas Memorial Hospital of Panama. There is a growing interest in tropical diseases among the student body and gradually a group of our medical school graduates interested and informed in tropical medicine are practicing in various parts of the United States where this special knowledge will be of value.

In the graduate school, through the utilization of courses offered in the School of Public Health and Administrative Medicine, the Medical School, the Graduate Faculties, and the Biological Station of the University of Michigan, a well-rounded program leading to the Ph.D. in parasitology, with special emphasis on its medical aspects, has been developed. Mr. Allen Mathies completed his studies this year and accepted a research fellowship in the Department of Pathology of the Medical School of the University of Vermont. Mr. Walter Stahl will probably complete the requirements for the Ph.D. degree this summer and he is planning on medical training and an academic career.

Missionaries who are preparing for service in the tropics audit lectures in parasitic diseases and gain practical experience in the diagnosis of parasitic diseases in our laboratory. This year we enjoyed having the following with us: Drs. L. Bowers, B. L. Huntwork, C. Yates, and D. A. Porter—all of Iran; Mrs. W. D. Newhouse, French Cameroons; Miss L. Bowden, India; Miss A. Stevens, India; and Sisters Catherine Maureen and Marian Jan, M.D., Tanganyika. Many of these missionaries have had wide experience in the tropics and have valuable contributions to make to our staff's education.

Continuing our close cooperation with the Tropical Diseases Diagnostic Service of the New York City Health Department a number of its staff audited courses given by the division and participated in its seminars.

Professors Brown and Kathleen L. Hussey and Dr. Kam-Fai Chan continued their studies on the chemotherapy of helminthiasis. An extensive study on the relationship of chemical constitution to anthelmintic activity was carried out jointly with the Chemistry Department of the Burroughs Wellcome Research Laboratories. The group has made fundamental studies on the biology of the pinworm and the host-parasite relationship. Mr. A. Mathies and Mr. W. Stahl, graduate students, are participating in these studies.

Investigations were conducted by Professor Roger W. Williams in Bermuda on rodent ectoparasites, filth flies, and the parasites of toads, lizards, and tree frogs. He also made a study of tropical diseases in Panama, Costa Rica, El Salvador, and Guatemala under the auspices of a Louisiana State University fellowship in tropical medicine. Professor Hussey has continued her summer studies on larval trematodes at the University of Michigan Biological Station with Dr. W. W. Cort, research professor of parasitology of the University of North Carolina. Professor Brown and Dr. Max M. Sterman have continued their studies on the chemotherapy of strongyloidiasis with Pyrroviniquinium chloride and have obtained excellent therapeutic results. They have also completed their epidemiological studies on echinococcus infection in man and dog in the same household in New York City. Professors Howard B. Shookhoff and Hussey are studying the mode of action of iodoaliphonic acid on tapeworms.

Special mention is due Professor Shookhoff and Dr. Sterman for their continuing cooperation and assistance in instruction of medical students and students of the School of Public Health and Administrative Medicine. The availability of the Tropical Diseases Diagnostic Service of the New York City Health Department adds greatly to our program in tropical medicine.

Professor Brown continued to serve as president of the New York State Board of Medical Examiners. He gave lectures at the medical schools of Seton Hall University, Cornell University, University of Vermont (Osler Lecturer), University of Puerto Rico, University of the Philippines, and Taiwan National University. Professor Brown visited Japan, India, Kashmir, Hawaii, Malaya, Ceylon, and Formosa to study medical education and medical care. He also consulted with groups from Liberia, Surinam, and Puerto Rico on medical education and health problems in these countries.

DIVISION OF PUBLIC HEALTH PRACTICE

Major changes made in methods of teaching public health practice in the preceding two years have been evaluated and modified with the resultant better integration with other courses, earlier introduction of basic background material, greater emphasis on the elements of public administration, and additional opportunities for active student participation through increasing use of case studies and problems for small group consideration. The field trip program which has been extended throughout all four quarters of

the School year has been organized in such a way that the field observations are related directly to what is being taught in the classroom. As in the past, the division depends heavily on its staff of public health practitioners who serve as part-time faculty members from the New York City Health Department, the Westchester County Department of Health, the New York State Health Department, and the Nassau County Department of Health.

With the beginning of this academic year Dr. Arthur Bushel, director of the New York City Health Department, Bureau of Dentistry, was appointed adjunct associate professor of dental public health practice and assumed responsibility for the dental public health programs previously under the direction of Professor Neal W. Chilton, who has become a research associate and is continuing his research activities.

This year, largely due to the needs of the division, a week was set aside at the beginning of the fourth quarter for all students for extended field trips to observe health programs in various places along the eastern seaboard. Students are assigned in small groups to a single community for the entire period of the field trip to learn of its composition and health programs and its organization for health services. This year the students visited Alexandria, Virginia; Plattsburgh, New York; Hartford, Connecticut; Staten Island; Rochester; Rockland County Health Department; and Yonkers. The School is indebted to the health officers who developed and supervised the programs for the students during this time.

Professor Spring has continued his activities in the New York Academy of Medicine's Committee on Medical Information, its Executive Committee and several subcommittees. He served as a member of the Executive Committee of the Metropolitan Chapter of the American Society of Public Administrators and is chairman of its Awards Committee. He is also a member of the Public Health and Sanitation Committee of the Commerce and Industry Association of New York City, the Medical Board of the Department of Correction of New York City, the Medical Committee (and chairman of the Public Health Subcommittee) of the Planned Parenthood Federation of America.

Professor Margaret W. Barnard has been on sabbatical leave during the academic year and has served as public health administrator in the Columbia-Washington Heights Community Mental Health Project conducted jointly with the Department of Psychiatry.

The School Health Survey of New York City, conducted under the auspices of the Community Council of Greater New York with Professor Spring serving as director of the study, is scheduled for completion in September, 1958.

DIVISION OF SANITARY SCIENCE

Professor Alvin R. Jacobson, returned from a tour of active duty with the United States Public Health Service. His activities were principally in the field of air pollution and radiological health. He participated to a con-

siderable extent in the program of continuation education and was responsible for the planning, organization, and conduct of four Institutes on Air Pollution for health officers, sanitary engineers, sanitarians, and others who may be responsible for the control of air pollution throughout New York State (the new Air Pollution Code went into effect on July 1, 1957). He also completed a study for the Interstate Sanitation Commission which consisted of collating, coordinating, analyzing, and interpreting the available data on air pollution in the New York-New Jersey Metropolitan area. Professor Jacobson is one of the co-authors of *Air Pollution, a Comprehensive Treatise*, which will be published by McGraw-Hill.

THE INSTITUTE OF NUTRITION SCIENCES

The Institute of Nutrition Sciences was activated during the year. Programs of study leading to graduate degrees in nutrition, with emphasis on the economic, biological, medical, and public health aspects of the subject, are being offered. It is planned to utilize the many outstanding available resources of the New York area for teaching and research. The President of the University has appointed an advisory board under the honorary chairmanship of the Honorable Herbert Hoover.

Professor C. Glen King became the chairman of the Institute's Administrative Committee; and Dr. William H. Sebrell, Jr., was appointed director of the Institute and professor of public health nutrition. Dr. Elmer L. Severinghaus more recently was appointed professor of public health nutrition.

A nutrition survey has been started in Haiti. Planning has been under way also for a study of the clinical material available in the nutrition clinic of the New York City Health Department situated in the building which also houses the School of Public Health and Administrative Medicine. A laboratory has been made available to the Institute at St. Luke's Hospital and is being equipped to begin animal research on nutrition. The School is indebted to Dr. Theodore B. van Itallie for making these arrangements possible.

A traineeship program is being developed and every effort is being made to provide the Institute with the facilities which it will require for the large-scale development contemplated by the University when this program was undertaken.

During the past year Professor Sebrell has served as chairman of the Committee on Protein Malnutrition of the Food and Nutrition Board of the National Research Council, as a member of the Scientific Advisory Committee of the Nutrition Foundation; as vice-chairman for the United States National Committee of the International Union of Nutrition Sciences; as a member of the Expert Advisory Panel on Nutrition of the World Health Organization; as a member of the Council of the Society of Experimental Biology and Medicine; as a member of the Standing Committee on Research

Policy of the American Public Health Association. Professor Sebrell is also a member of the Board of Directors and vice-president of the National Health Council; he is vice-chairman of the Council on Research of the American College of Preventive Medicine. He further is serving as chairman of the American Public Health Association Editorial Subcommittee to develop a handbook on nutrition and is a member of the Technical Advisory Committee of the Institute of Nutrition of Central America and Panama. He participates in the activities of the Food and Nutrition Council of Greater New York, is a consultant to the United Nations Children's Fund, and has testified during the academic year before the New York State Legislature Hearing on Chemical Additives in Food.

CONTINUATION EDUCATION IN PUBLIC HEALTH

The development of opportunities for continuing education for public health personnel expanded considerably during the academic year. Institutes have been repeated in various locations of New York State. An Institute on Air Pollution was held four times, and a series on chronic disease were completed. The program actually provided eleven institutes during the year and developed plans for several more. A special course for administrators of voluntary agencies is under development, but will be patterned more nearly like the course being given in basic hospital administration: there will be a two-week on-campus session followed by home study material and another on-campus session a year later.

Enrollment at the institutes for public health personnel is restricted at present to persons with administrative and supervisory responsibilities. There were more than three hundred individual enrollments during the year.

Instructors for the various institutes are drawn from the fields of public health, both official and nonofficial, from various medical faculties, from other departments of state government, from university faculties of political science and other nonmedical areas, from industry, from private research organizations, from the state legislature, from local government, including city managers and members of boards of supervisors, and from voluntary agencies. The academic nonmedical faculty members have been enlisted from Columbia, Colgate, New York, and Syracuse Universities. The medical faculty members have come chiefly from Columbia and from the Albany and Rochester Medical Colleges.

There has been a genuine interest and enthusiasm on the part of most students for the opportunities to be brought up to date on new developments in medicine and public health and to review some basic concepts. Particularly gratifying has been the willingness and interest of people from outside the public health disciplines to assist as teaching members in the institutes. A five-day Institute on Management and Public Health held in June, 1957, was edited during the past year and was distributed during the current academic year.

Professor Mabel Ingalls continues to act as director of the program of

continuation education for public health. She is aided by many faculty members from the School and by Misses Jane Robertson and Naomi Freistadt.

The faculty members responsible for the continuation education program now occupy newly renovated quarters on the seventh floor of the Health Center building. The generosity of the New York City Health Department, which rearranged its services for patients with tropical diseases, made the new quarters possible.

CONTINUATION EDUCATION FOR HOSPITAL ADMINISTRATORS

The first class of hospital administrators to take the basic hospital administration course completed a year of intensive study of hospital organization and management during the academic year. Forty-one administrators of hospitals of one hundred beds or less in size enrolled in the course in June, 1957. Of these, thirty-nine completed the course, one withdrew because of serious illness, and one transferred to the 1958-1959 class. One of the more gratifying aspects of the program was the sincere attention and assistance provided the students by their preceptors. Thirty-nine preceptors are serving the program without compensation.

As an adjunct activity and in cooperation with officers of the American Academy of Occupational Medicine, a short-term Institute for Physicians in Industry was organized. Twenty-three physicians working in the full-time specialty of industrial medicine participated. The reaction to this Institute was most favorable and the School has been requested to expand and repeat this offering in 1959.

The basic course in hospital administration has created a great deal of interest throughout the world. Thus far, assistance in the form of materials, discussions, or consultations has been given to the Canadian Hospital Association; the Universities of California, Mexico, São Paulo, Brazil, and Chile; the Costa Rica Hospital Association; Stockholm University, Sweden; Cairo University, Egypt; and the Mississippi Hospital Association. This work has been under the direction of Professor Harold Baumgarten, Jr.

Radiology

EXECUTIVE OFFICER: Professor William B. Seaman

The major educational and research efforts during the past year have been directed toward the investigation of new technique and equipment that will reduce the amount of radiation received by patient and personnel during

diagnostic roentgenography. The teaching program has been thoroughly reviewed in an effort to further integrate the teaching of radiology with other subjects and develop an over-all four-year program.

Dr. Samuel H. Madell left to join the faculty of the Albert Einstein School of Medicine. Dr. Jerome Nadelhaft was appointed professor of radiology at the Chicago Medical School. Professor Donald J. Barnett resigned to enter private practice. New appointments consisted of Professor Leonard C. Doubleday, Dr. Spinks H. Marsh, and Dr. Alexander D. Crosett, Jr. as instructors. Professor C. Wadsworth Schwartz, a member of this department for more than twenty years, passed away in October, 1957. Professor Schwartz had made many contributions to radiology in general and neuroradiology in particular.

Professor John Caffey was elected honorary member of the Royal Society of Medicine and the American Orthopedic Association.

Professor Harold W. Jacox is continuing his studies with Professor Fred Vance Lucas in the effects of radiation on normal and malignant tissue, and the effect of radiation on the kidney. With Professors Howard C. Taylor, Jr., and Equinn W. Munnell of the Department of Obstetrics and Gynecology he is evaluating the results of treatment of ovarian cancer. He and Professor Henry C. Frick are conducting a similar study of cancer of the uterine cervix. Professor Jacox and Professor John J. Conley of the Department of Otolaryngology are investigating the effects of radiation on the cytology of the oral cavity. He is writing a chapter on the treatment of apical chest tumors for a forthcoming series of books on the treatment of cancer and allied diseases, and a chapter on radiation therapy for a book on lung and mediastinal tumors. He continues as coeditor with Professor Morton M. Kligerman of the radiation therapy section of the *Year Book of Radiology* and as associate editor of *Radiology*.

Professor Juan M. Taveras continues his investigation with Professor Edward B. Schlesinger of the Department of Neurological Surgery on brain tumor localization with radioactive isotopes. He is also collaborating with Professor Alfred Gellhorn of the Department of Medicine, Dr. Hartwell G. Thompson, Jr. of the Department of Neurology, and Professors J. Lawrence Pool and Joseph Ransohoff of the Department of Neurological Surgery, in a project to evaluate the effect of a combination of radiotherapy and chemotherapy in the treatment of neuroblastoma. He has given several post-graduate courses in neuroradiology to groups including the New England Medical Center in Boston and the Academy of Orthopedic Surgeons. He attended the Fifth Neuroradiological Symposium in Brussels, Belgium.

Professor Kligerman is on sabbatical leave and is studying radiobiology at Stanford University Medical School with Professor Henry B. Kaplan. He continues as co-editor of the *Year Book of Radiology* and consulting editor of the *Cancer Year Book*. He is continuing research with Dr. Daniel M. Shapiro of the Department of Surgery on combination chemotherapy and radiotherapy in the treatment of cancer. Professor Kligerman and Dr.

Norah duV. Tapley participated in a graduate course on radioactive isotopes. Dr. Tapley continues to study the role of radiation therapy on retinoblastomas in conjunction with Professor Algernon B. Reese of the Department of Ophthalmology.

Professor Josephine Wells is studying the relationship of leukemia in children to radiation in pregnancy with Professor Charles M. Steer of the Department of Obstetrics & Gynecology. She and Professor Frank E. Stinchfield of the Department of Orthopedic Surgery and Dr. Eli Bauman of the Department of Medicine are presenting the results of a study on resorption of the femoral head to the American Orthopedic Association. She is also beginning study of esophageal varices with Dr. Arthur B. Voorhees, Jr., of the Department of Surgery.

Dr. Luther Jarvis has completed a study of idiopathic adrenal calcification and its relationship to childbirth trauma and is beginning a study on the detection of sacral lesions.

Drs. Robert J. Hochstim and Kent Ellis are reviewing our entire roentgenographic experience with hyperparathyroidism. Dr. Melvin H. Becker with Professor Caffey is preparing an exhibit on metastatic rhabdomyosarcoma for the American Roentgen Ray Society.

Dr. Ellis is studying the radiographic findings in transposition of the great vessels. With Dr. Seamus Lynch of the Department of Anesthesiology he is investigating the effect of alternating positive and negative endobronchial pressures on the calibre of the bronchi. He assisted Dr. Otto Hase of the Department of Surgery in the development of a roentgen technique for coronary artery angiography.

Dr. Ralph Schlaeger has collaborated with Professor Edmund N. Goodman and Dr. Henry Colcher of the Department of Surgery in studying the postoperative stomach. He continues to review our experience with intravenous cholangiography. Dr. Meyer Alpert is analyzing the normal lumbar intervertebral disc and is studying discography with Professor Everett C. Bragg of the Department of Orthopedic Surgery.

Professor Gerhart S. Schwarz is writing a book on clinical roentgenometry and is investigating the silver content of x-ray films as pertaining to the ideal film emulsion. He is also investigating the use of green emitting intensifying screens with panchromatic film in an effort to decrease the amount of radiation required for diagnostic purposes. Professor William B. Seaman has been studying the roentgenographic aspects of congenital anomalies of the pulmonary vessels.

Professor Arnold L. Bachman has completed writing a chapter on the radiology of pulmonary and mediastinal tumors for a book on pulmonary neoplasms. He continues to study the normal and abnormal physiology of swallowing and intraosseous venography. He is analyzing the radiological appearance of the lung following supervoltage irradiation for breast cancer. Professor Ruth J. Guttmann with Dr. Carl Steglich is evaluating esophageal cancer treated with Cobalt 60 therapy. She has investigated the different

qualities of Cobalt 60 sources and equipment and presented this to the American Radium Society.

Mr. Carl B. Braestrup has been studying the radiation hazards of electronic tubes and has developed an automatic scanning device for use with a scintillation counter and recorder. He continues to study the physical properties of Cobalt 60 teletherapy with particular reference to the problem of penumbra.

As in the past, the activities of the radiological research laboratory have been divided between a research project for the Atomic Energy Commission and a program including teaching in various aspects of radiological physics and problems related to therapeutic radiology and medical uses of radioactive isotopes. The radiological physics section is primarily concerned with absolute measurements of both the quantity and quality of radiation as delivered to tissue. In addition to investigating new methods of measurement, considerable effort is being spent in determining certain parameters which are essential in the precise dose determination by the ionization method.

Professor Gioacchino Failla, Mr. W. Gross, Mr. Bruce R. Allen, and their associates have been developing a method to compare directly the absorbed dose (in rads) in various "tissue" compositions with the x-ray exposure dose (in roentgens).

Some survey meters of the Federal Civil Defense Administration were calibrated with the beta rays of Th^{204} and P^{32} for a special project. An ionization chamber has been built and calibrated for the measurement of the energy emission rate of the beta rays of tritium.

Mr. Allen and his associates are investigating the plasma binding of irradiated and non-irradiated rabbits. They are also studying growth inhibition of bacterial cultures.

Professor Harald H. Rossi, Dr. Ruth F. Hill, and their associates continued to study tissue equivalent ionization chambers and their use in the calibration of radiation sources, particularly those emitting neutrons. A number of other laboratories both in this country and in Europe were aided in the establishment of dosimetric techniques using tissue equivalent chambers.

Studies with the L.E.T. spectrometer have shed new light on the detailed manner in which doses are delivered by monoenergetic neutrons. This work will be included in the United States contribution to the Second International Congress for the Peaceful Uses of Atomic Energy, which is to be held in Geneva. Research towards the miniaturization of the spherical counter is progressing and a model is under construction which will permit the evaluation of the particle spectrum occurring in tissue volumes having diameters of less than 0.1 micron.

Professor Rossi and Mr. Francis deFriess have designed and constructed a 5 curie Cesium source to be used for checking the constancy of low sensitivity ionization chambers.

A new system for the measurement of integral dose delivered under a variety of conditions has been constructed and initial measurements are in

progress. To facilitate a proposed study for various radiographic techniques a phantom incorporating materials of graded density is being designed. For this project an auxiliary apparatus has been built by which bone may be cut with a minimum of impaction. A study has been initiated in which the radiation output of diagnostic machines will be correlated with the aging of tubes. All of these studies are designed to provide methods for further reduction of patient exposure.

As in previous years, a considerable amount of routine work was performed, including calibration of therapeutic units, direct measurements and calculations of radium applications, assistance in training of residents, and treatment planning.

The research of Professor Roberts Rugh and his associates has been directed toward four main topics: lethality studies, effect of radiation on the gonads, effects of radiation on the fetus, and tumor studies. Hibernating and tranquilizing drugs have been used with adult mice to determine their value in altering the LD/50/30 days of whole body x-irradiation. The minimum x-ray exposure of the adult female to cause ultimate sterility has been determined as 20 r. The fertile life span of every female so exposed was reduced. Adult males of any species appear to be more radiosensitive than the females. Professor Rugh is also studying the effects of radiation on the fetus with particular reference to its effect on the developing nervous system, the production of sterility, and the placental barrier.

Members of the staff of the radiological research laboratory take part in a wide variety of activities, both within the institution and in national and international organizations: Professor Failla has continued to serve as chairman of the Radioisotope Committee of the Medical Center, and Professor Edith H. Quimby is also a member of the committee. Over one hundred applications have been received and reviewed during the past year. Professor Failla has continued to be active in work with the Atomic Energy Commission and other government agencies, both civilian and military, on problems related to atomic energy. He is consultant to several of the Atomic Energy Commission installations and is a member of the Review Committee for the Division of Biological and Medical Research of the Argonne National Laboratory. He is also chairman of the Radiation Instrument Panel of the Armed Forces Special Weapons Project, vice-chairman of the International Commission on Radiological Protection, and a member of the International Commission on Radiological Units. He is also a member of the Genetics Committee of the National Academy of Sciences, a member of the Advisory Panel on Medical Sciences of the Department of Defense, a member of the Scientific Advisory Board of the Walter Reed Army Medical Center, and a member of the Committee on Units, Standards and Protection of the American College of Radiology.

Professor Quimby is a member of the Advisory Committee on Isotope Distribution of the Atomic Energy Commission, of the National Committee on Radiation Protection, of the subcommittee on Handling and Disposal

of Radioactive Isotopes of the International Commission on Radiological Protection, and of the Commissions on Education and on Radiological Units, Standards, and Protection, of the American College of Radiology. She is chairman of a subcommittee of the National Committee on Radiation Protection which has just completed a revision of *Handbook 56*, on safe handling of bodies containing radioactive isotopes (this will appear shortly as *Handbook 65*). She is also a member of Subcommittee M-1, Standards and Measurements of Radioactivity for Radiological Use. She is an examiner for the American Board of Radiology, and on the editorial advisory boards of *Radiology* and *Cancer*.

Members of the laboratory staff carry on various teaching activities. Professors Failla and Quimby continue to be members of the Subcommittee on Biophysics of the Joint Committee on Graduate Instruction. Eight students have now completed their work for the Ph.D. degree under the subcommittee and several others are in various stages of their courses. Instruction for students in this field is offered by Professors Failla, Quimby, Rugh, and Rossi. The course in clinical use of radioactive isotopes under the joint leadership of Professor Quimby and Professor Sergei Feitelberg, and with the cooperation of several guest lecturers, has been so popular that it has become necessary to offer it twice yearly. It is given as a concentrated full-time course during four weeks in June for doctors who do not live in the metropolitan area and again on a basis of one afternoon a week for eight months, October through May, for those in the vicinity. In the fall and winter course of 1957-1958 and the June course of 1958, a total of sixty-five doctors received training. By July 1, 1958, a total of 225 doctors will have completed this training course. These have come from twenty-five states and ten foreign countries. Professor Quimby continues to give regularly scheduled lectures in radiologic physics, and to supervise the work of the residents in radiology during their assignment to the radioisotope laboratory. These residents have taken or are taking the clinical isotope course mentioned above and in the laboratory have additional practical experience. Several of those who have completed their residencies have been qualified to establish radioisotope laboratories in conjunction with their own practices after leaving this institution. A course leading to a Master's degree in radiologic physics has been organized by Professors Rossi and Quimby, with the cooperation of members of the staff of the radiological research laboratory, the clinical radiologists, and several guest lecturers. It will be offered in the coming year.

Professor Rossi is a member of the National Committee on Radiation Protection, chairman of Subcommittee 4 and a member of Subcommittee M-3. He has been appointed technical secretary of Committee 1 of the International Commission on Radiological Protection. He is a member of the St. Luke's Isotope Committee and a member of the Dosimetry Panel of the Radiation Research Society.

Professor Rugh is a member of a subcommittee of the National Com-

mittee on Radiation Protection on standards and measurements of radioactivity for radiological use. He has been invited to participate in the First International Congress of Neurological Science in Brussels in July, 1958, as *rapporteur* and to direct the discussions pertaining to fetal neurological effects of ionizing radiations. During the coming year he expects to entertain one or more visiting professors on sabbatical leave who wish to carry out directed research in radiobiology. He has just completed a chapter, "Effects of Irradiation of Gametes and Embryos," for a book to be published by Academic Press under the title of *Mechanisms in Radiobiology* by Forssberg and Errera (to appear in 1959).

During the last year there have been three foreign students in the laboratory working on radiological physics problems. Professor Mario Chiozzotto of the Istituto Superiore di Sanita of Rome has spent a year with us to acquire practical experience in radiological physics and allied fields.

Professors Failla, Quimby, Rossi, and Rugh have appeared on programs of national and local radiological, medical, physical, and other societies and have given a number of lectures to medical and lay audiences. Professor Quimby gave one of the Lectures to the Laity at the New York Academy of Medicine on the future of radioisotopes in medicine. The demand during the past year has been particularly heavy for talks on radiation hazards and radiation safety.

Surgery

EXECUTIVE OFFICER: Professor George H. Humphreys II

The high level of clinical and research activity which has characterized the department in recent years has been maintained. Although the gross total of operations declined slightly, the number of new and complex procedures, representing the growing edge of clinical surgery, has steadily increased. Research interests are directed along five major lines—pathology, bacteriology, physiology, metabolism, and cancer research. In terms of meetings attended and papers read or published the department has never been more productive.

Changes in staff have been few. Six residents completed their training from six and one-half to ten years after graduation from medical school and after training periods in the department of from two to eight and one-half years. Three have taken academic positions in Oregon, Louisiana, and Jamaica. A fourth is in charge of graduate training in a large surgical clinic in Ohio. The remaining two continue as instructors in this department. An

instructor who finished his residency three years ago resigned to accept an important teaching post at the University of Miami. Thus the prime purpose of the department in training teachers is being adequately fulfilled.

The death of Professor Thomas W. Stevenson, Jr., who died on February 22, 1958, brought a great loss to the department. When Dr. Webster retired on July 1, 1954, Dr. Stevenson succeeded him as attending surgeon and chief of the Plastic Surgical Division at Presbyterian Hospital and professor of clinical surgery in the College. He was a founder member and president of the American Society for Surgery of the Hand and consultant to the New York Orthopedic, North Westchester, and Phelps Memorial Hospitals.

The appointed time for the retirement of Professor David C. Bull arrived during the past year. He was chief of the Surgical Out-Patient Department from 1923 to 1928, and when the Hospital moved to 168th Street, he became chief of surgery in Vanderbilt Clinic. He had received the Purple Heart, the Silver Star, and the Selective Service Medal during the First World War. He was a founder, medical director, and chairman of the Board of Medical Control and trustee of the Blood Transfusion Association, as well as a member of the Medical and General Advisory Committee of the American Red Cross blood program.

On April 1, 1958, Dr. Daniel Shapiro resigned his instructorship to accept an appointment as associate professor of surgery in charge of research at the University of Miami. Dr. Keith Reemtsma was appointed assistant professor of surgery at Tulane University and at Charity Hospital in New Orleans. He received the degree of Doctor of Medical Science from Columbia University on the basis of original research on the pathological anatomy of the cardiac conduction fibres in congenital heart disease. Dr. Albert Starr, after completing the residency in thoracic surgery on June 30, 1957, joined the staff of the University of Oregon Medical School.

On July 1, 1957, Dr. Richard Britton joined the surgical staff of the Cleveland Clinic. Dr. Don O. Gore on completion of his residency, returned to Jamaica, British West Indies, to accept a post as lecturer in the University Medical School there. Dr. Sanford Weissman was appointed instructor on completion of his residency training, the last six months of which were at the Francis Delafield Hospital. Dr. Weissman will assist in the teaching and training program at the Delafield. Dr. Norman Thomson was appointed instructor on completion of his period as resident in thoracic surgery. A fellow of the New York Heart Association, Dr. Thomson has become an important member of the team conducting the research and clinical program in open-heart surgery.

Changes in undergraduate teaching have been in content rather than curriculum. This year the second-year introductory course has been broadened in scope by Professors Raffaele Lattes and Virginia Kneeland Frantz, and Dr. Philip D. Wiedel has been assigned to act as clinical coordinator. In the third year, students have been assigned in small groups to single

preceptors who have been relieved of all other duties during this brief period in order to concentrate on student-teacher contact. The fourth-year clerkships at Presbyterian and affiliated hospitals continue to be effective.

In the laboratory of surgical pathology under the direction of Professor Lattes, a total of 10,698 specimens were examined in 1957, as compared to 5,761 in 1947. Numbers alone do not present a complete picture, however, for the complexity of examination of certain specimens, such as the meticulous search for cancer-bearing lymph nodes by clearing techniques, has also added greatly to the time required to perform adequate study. Such studies, while they constitute a valuable part of the research and teaching function of the laboratory, also augment to a high degree the quality of patient service. It remains the most productive unit of the service, as evidenced by authorship or collaboration by members of its staff in thirty-two of the eighty-two papers published from the department this year.

Professor Frantz and her associates have continued the study of the relationship between the histological type and the biological behavior in various forms of thyroid cancer. A histopathological study is also in progress of the correlation of the histological picture in hot and cold nodules after treatment with desiccated thyroid and triiodothyronine.

Professors Robert S. Grinnell and Nathan Lane have completed their studies on the relationship between benign and malignant diseases of the colon and rectum defining the limits of benign disease and the indications for radical surgery.

In October, 1957, the pathology laboratory of the Department of Urology under the direction of Professor Meyer M. Melicow moved to the fourteenth floor in the area occupied by the laboratory of surgical pathology. The technical and clerical services of the two services were amalgamated. The surgical specimens from the Department of Urology are being prepared and studied in the laboratory of surgical pathology under the supervision of Professors Lattes and Melicow.

Under the direction of Professor Margaret Murray the laboratory for cell physiology has extended its program of basic research on the living cell in three main directions. The first is concerned with the normal development and functioning of nervous tissue, especially the formation and maintenance of myelin. Dr. Murray Bornstein, a visiting research fellow, has developed a method of cultivating central nervous tissues which also permit serial observations.

In collaboration with Professor Erwin Chargaff of the Department of Biochemistry, Miss Helena Benitez has been investigating adult rat fibroblasts. In collaboration with Professor Dan Moore of the Department of Microbiology, Dr. Lasfargues has made some progress in characterizing the milk agent for mouse mammary carcinoma, by correlating physical methods with bio-assay.

The preparation of a current supplement to the two-volume *Tissue Cul-*

ture Bibliography published in 1953 has been undertaken by Miss Gertrude Kopech. The laboratory functions also as a postdoctoral training center in methods and principles of tissue culture.

During the past year the diagnostic service of the laboratory of surgical bacteriology under the supervision of Miss Balbina Johnson processed more than seven thousand cultures. These cultures were received from the general surgical, orthopedic, head and neck, and neurosurgical services.

Because of the nationwide concern over the increase in antibiotic-resistant staphylococcus as the causal organism in postoperative infections, the research work of the laboratory has been concentrated on this problem. In addition to the analysis of the postoperative infections made for the Wound Infection Committee, the air of the operating rooms and wards has been sampled for the presence of these staphylococci, as well as the nose and throat flora of the hospital personnel and patients. Bacteriophage typing of staphylococci has been made available to us through the typing laboratories of the Department of Microbiology and of the Eye Institute. Sources of cross infection are now being traced by the typing of the organisms recovered from wound infections as well as from severe infections developing before hospitalization.

A three-year study of postoperative diarrhea has been completed. The laboratory has done all cultures required by Professor Arthur H. Blakemore and Dr. Arthur B. Voorhees, Jr., in their study of hepatic coma following portacaval shunts. Through our connections with Dr. Bywater of S. B. Penick and Company we were able to arrange for a supply of 15,000 neobacin tablets for patients on this study. For the past two years the laboratory has done culture of intestinal flora of rabbits as required by Dr. Frederic P. Herter and Professor Thomas V. Santulli in their project. Professor Robert B. Hiatt continued his studies on ulcerative colitis.

In the general category of surgical physiology may be grouped a number of research projects centering around the animal operating room on the seventeenth floor. To Mrs. Sally Miller, who replaced Miss Daisy Mapes on July 1, 1957, goes great credit for maintaining effective order during the period of construction of the new animal quarters. Over five hundred operations were performed, including many related to research or teaching programs of seven departments in addition to surgery.

Professor Ralph A. Deterling, Jr., who is in general charge of these laboratories, has continued, with Dr. Shivaji B. Bhonslay, his long-range studies on vascular grafts and prostheses. In addition, studies on "open-heart" operations with extracorporeal circulation begun two years ago have continued with the added impetus of a closely related clinical program. On February 1, Dr. Norman Thomson joined this group after a tour, as Lambert Traveling Fellow, of the major research and clinical centers in this field in the United States. A variety of pump-oxygenators are under study, and physiologic alterations following perfusion are being investigated in collaboration with

Professor Duncan A. Holaday and his co-workers in the Department of Anesthesiology.

Also in the field of cardiovascular physiology as related to surgical problems, Professor Aaron Himmelstein has begun a study of pulmonary hypertension. Professor Ferdinand F. McAllister has completed a three and one-half year appraisal of the result of plastic cloth implantation into the right ventricular outflow tract. In addition, with Professor Deterling and Drs. Bhonslay and Al-Naamen, studies of prosthetic cardiac valves has been initiated. Further studies of collateral circulation and deposition of cholesterol in arteries are continuing in collaboration with Dr. Julius H. Jacobson of the resident staff and Professor Alfred Steiner of the Department of Medicine. With the assistance of Professor Holaday of the Department of Anesthesiology, Dr. Kent Ellis and Professor C. Wadsworth Schwartz of the Department of Radiology, Dr. Ottoheinrich Hase carried out a study of coronary arterial visualization by contrast medium injection in living animals. Finally, development of phonocardiographic correlations with experimentally produced cardiac lesions in the laboratory and surgically verified cardiac lesions in the operating room were carried out by Professor Deterling's group in cooperation with Professor William Rogers of the Department of Anatomy.

Other short-term projects carried out in the animal operating room include: a study by Drs. Frederic P. Herter and Archibald G. Fletcher on the absorption of ascitic fluid; a study by Dr. Fletcher and Professor Deterling on the use of colon to replace resected esophagus; a study by Drs. Arthur B. Voorhees and Alfred Greenfeld of the effects of variations in structure of plastic tubes used to bridge arterial defects; a study by Dr. Daniel Shapiro of gastric acidity in animals as modified by vagectomy or antral mucosal stripping.

Dr. John F. Prudden has continued his studies of the nature of the stimulation of normal wound healing. Additional effort is now being made to demonstrate the biochemical nature of the wound stimulating fraction of cartilage, to show the effectiveness of the preparation in the wounds of many mammalian species, and to do a thorough histologic study of the cartilage effect, the latter in collaboration with Professor Lattes.

For the laboratory of Professor Edward L. Howes this year, Worthington Enzymes and Agriculture Biologics began to make collagenase on a commercial scale. Ointment bases were perfected that would allow the enzyme to be continuously given off to the area to be treated. The susceptibility of the sero-mucoproteins (the blood mucoproteins) to various enzymes was investigated.

In the electrogastrogram laboratory, Professor Edmund N. Goodman and Dr. Henry Colcher of the Department of Medicine, with Mr. George Katz, have extended their techniques to include various phases of gastrointestinal physiology. Methods have been developed for the coordinated investigation of electrical phenomena with the motor functions of the esophagus, stomach,

and small intestine. These include various arrangements of electrodes, methods of studying pressure volume changes with different types of balloons, air and fluid open-tip catheters, devices for the study of motility in dogs and humans, recording of pH, intragastric color photography, and study of motility with the image intensifier. Interesting clinical observations have been made in collaboration with Professor Harold D. Harvey, Professor Charles A. Flood of the Department of Medicine, and Dr. Ralph Schlaeger of the Department of Radiology.

Experimental work along a variety of lines has continued in the surgical metabolism unit under Professor Harold G. Barker. The physiology of fat digestion and absorption is being studied using radioactive iodine as a tag. Patients with intestinal disorders of various types have been studied with the collaboration of Drs. Keith Reemtsma, James R. Malm, and John Wood, and Professors Michael J. Lepore of the Department of Medicine and Paul A. di Sant'Agnese of the Department of Pediatrics. Basic studies of fat absorption have been started in the animal laboratories by Dr. Robert Beals and Dr. Frank Gump, and in normal humans by Dr. Beals and Dr. Robert P. Noble of the Department of Medicine. The work in which Dr. Noble is participating involves the separation of serum lipid fractions by paper electrophoresis and by ultracentrifugation followed by counting the radioactivity. Dr. Arthur B. Voorhees, Jr., and Professor Arthur H. Blake-more have continued their collaboration in work on the usefulness of antibiotics in the prevention of ammonia intoxication in postportacaval shunt patients. Dr. Arnold Mittelman and Dr. Beals have conducted further experiments in steroid physiology with particular reference to surgical stress and to water and salt retention in patients with ascites. Steroid physiology in patients and dogs subjected to open-heart surgery is also being investigated with Professor Ralph A. Deterling, Jr., and Dr. Shivaji B. Bhonslay also participating. The series of patients with cirrhosis and ascites who have been subjected to portacaval shunt operations has been expanded. Professor Blake-more has collaborated in this effort. Dr. Alan Merchant completed his year as full-time research fellow and Dr. Robert Beals is spending a similar period.

In cancer research, mention has been made of the studies on propagation of the virus-like mouse milk agent by Dr. Lasfargues in the laboratory of cell physiology. This work forms a part of Professor Cushman Haagensen's continuing study of this cancerogenic agent. Milk obtained from his mouse colony is the common denominator in a broad program to identify, characterize and produce immunity to the agent, in which Professor Haagensen is collaborating with Professor Michael Heidelberger at Rutgers, Professor Dan Moore at the Rockefeller Institute, and Dr. Ernest Pollard at Yale University.

Dr. Daniel Shapiro, who has been studying the effect of combinations of compounds for control of cancer for the past five years, demonstrated during the past year the reciprocal effectiveness of these compounds in relation to total tumor mass. Dr. Shapiro's major laboratory activity was transferred to Miami at the end of the year, but clinical evaluation will continue under his

supervision at the Presbyterian and Delafield Hospitals. Studies on tolerance to 6-aminonicotinamide, one of the promising new compounds, was begun under the direction of Dr. Frederic P. Herter at the Delafield Hospital this year.

Other studies related to cancer include those of Dr. Herter and Professor Thomas V. Santulli on the relationship of intestinal flora to the implantation of cancer at the suture line following colon resections, and the studies of hemangiomas by tissue culture techniques initiated by Dr. Mary S. Parshley and Dr. George Crikelair. The teaching material continues to be abundant, though preservation of balance between service and private patient care is a source of concern. It has been found possible to use private patients to an increasing degree in teaching.

After many months of laboratory preparation in the elaboration of surgical and mechanical techniques and in the development of teamwork in utilizing them, open-heart operations were begun on patients. The first operation was performed on September 25, 1956, and in the past twenty-two months more than thirty such procedures have been carried out. The era ushered in by the successful performance of these operations has been likened to the introduction of anesthesia and aseptic technique.

Management of the surgical and technical procedures involved in the care of these patients is in the hands of a team consisting of Professor George H. Humphreys II, Dr. Shivaji Bhonslay, Professors Deterling, McAllister, and Aaron Himmelstein, and Drs. Norman Thomson and James Malm of the resident staff. In addition, Professor Sidney Blumenthal of the Department of Pediatrics and his group from pediatric cardiology, Professor Howard G. Bruenn of the Department of Medicine and his group from medical cardiology, Professor Alfred P. Fishman of the Department of Medicine and his group from the cardio-respiratory laboratory, Professor Emanuel M. Papper and an assigned group from the Department of Anesthesiology, Professor John Scudder and his blood bank service, are integral and invaluable members of the team.

In the affiliated hospitals, integration of teaching and training programs continues. It is probable, however, that the quantity and variety of clinical material, which includes many types of illness differing from those seen at Presbyterian Hospital, could be more fully utilized.

FRANCIS DELAFIELD HOSPITAL

Under the direction of Professor Cushman Haagensen, integration of the residency program with that at Presbyterian Hospital is now complete. As a unified program, all assistant residents will spend several months in their first year of training, gaining insight into the long-term care of the patient suffering from cancer. At the end of their resident training, they return for an additional six months at a period in training when they are capable of

carrying out the extensive procedures which are often required. An elective clerkship for fourth-year medical students is increasingly popular.

FIRST SURGICAL DIVISION OF BELLEVUE HOSPITAL

Under the direction of Professor Kenneth M. Lewis, Sr., the division continues as an active general surgical service including fractures, orthopedic surgery, and plastic surgery. A new outpatient peripheral vascular clinic has been organized, as well as combined surgical-medical coverage of the gastrointestinal clinic. The undergraduate teaching program for third- and fourth-year students has been very well received and much enjoyed by the participating students and members of the staff. The fourth-year medical students serve in groups of four for one-month periods as externs on the service. Once a week throughout the year a group of third-year medical students spend three hours on the surgical wards. These sessions are conducted by various members of the staff and afford an opportunity for the students to observe surgical problems of a nature they would not ordinarily see in Presbyterian Hospital. A person appointed for surgical residency training spends the first year at Bellevue, two subsequent years at Presbyterian, and returns to Bellevue for his final year as chief surgical resident.

ROOSEVELT HOSPITAL

The surgical services continue their affiliation with the Columbia College of Physicians and Surgeons in the teaching of fourth-year students. There are usually four students in surgery at any one time, two on each surgical service. The very active ambulance service and the emergency room (where approximately 4,000 patient visits are made each month) afford much material of interest and teaching value. The students serve as important members of the team on the wards and in the operating rooms. There are daily ward rounds, two formal teaching sessions each week, a surgical conference for the entire surgical service each Saturday, which features a review of the week's work, demonstrations in surgical pathology, and presentation of patients. The students also take part in the monthly general staff conference, the clinical-pathological conferences, and the monthly tumor conference.

ST. LUKE'S HOSPITAL

During the year 1957, under the direction of Professor Harold A. Zintel, the general surgical service has had a maximum of six students at a time. The students spend every other day making ward rounds in the morning and then work in the outpatient clinic, the emergency room, and the wards in the afternoon. They participate in the weekly house staff and general surgical conferences and attend the monthly surgical staff conference. The teaching

program is under the direction of Dr. W. Graham Knox. Drs. Knox, Richard B. Stark, Hugh F. Fitzpatrick, Carl Oakman, William Medl, Harold A. Zintel, and others review diagnosis, pre- and postoperative care, electrolyte problems, fractures, trauma, urological problems, basic principles of anesthesia, pediatric surgical problems, and current patient problems. Some of the students also obtain a brief exposure to one of the sixteen studies in progress in the surgical research laboratories.

MARY IMOGENE BASSETT HOSPITAL

The surgical service of the Mary Imogene Bassett Hospital at Cooperstown, New York, under the direction of Professor John Powers, has continued its close relationship with the department. Each year an assistant resident selected for residency at Cooperstown spends one year of training at the Presbyterian and Delafield Hospitals. Since 1954 senior students at the College of Physicians and Surgeons have been allowed to elect their fourth-year surgery at the Mary Imogene Bassett Hospital. These students spend two months on the service as clinical clerks and occasionally as subsidiary interns. During this period they have an opportunity to observe the practice of surgery in a rural area, to study the surgical problems which arise as a result of serious agricultural and motor vehicle accidents, and to become thoroughly acquainted with the more common clinical, operative, and post-operative surgical problems. Formal exercises include daily seminars with the members of the senior staff and resident, teaching ward rounds with the senior surgeons, surgical journal club, pathological conferences, x-ray conferences, and grand rounds.

MOUNT SINAI HOSPITAL

Dr. Ivan D. Baronofsky, who was appointed as clinical professor of surgery on January 1, 1957, took up his post as director of the surgical services of Mount Sinai Hospital on his return from the Navy in the spring. During the past year, the surgical service at the Mount Sinai Hospital affiliation of the College of Physicians and Surgeons has made definite progress toward the ultimate goal of a university hospital service. The residency program has been fully activated into a graded four-year program which is acceptable to the American Board of Surgery. The experimental surgical laboratory has been reactivated, and residents spend a period of a year here as part of the residency program.

MONTEFIORE HOSPITAL

Under the direction of Professor Elliott Hurwitt, activation of the new surgical research laboratories provided the opportunity for a number of in-

vestigations, with a primary orientation into cardiovascular problems. A motion picture of a successful clinical application of this method was demonstrated to the students at the College of Physicians and Surgeons, and shortly thereafter was employed by Professor Deterling. Members of the house staff have played an active part in laboratory activities as well as in the regular teaching program each week of rounds and conferences in surgery, surgical radiology, and surgical pathology.

The department has benefited by visits from over 150 surgeons, eighty-six of whom were from other countries. Dr. Charles Rob, professor of surgery at St. Mary's Hospital, London, acted as director pro tempore of the Presbyterian Hospital Surgical Service during the week of October 17. On October 10 he delivered the Third Sample Lecture on arterial reconstruction with special reference to thrombosis of the abdominal aorta.

The Department was also host to a group of Russian surgeons who presented a film on experimental transplantation of the heart. Professor Shiget-sugu Katsura, professor of surgery at Tokohu University, Sendai, Japan, presented a film showing his technique for transplantation of a segment of jejunum to an area of resected esophagus. Professor Edmondo Malan, director of the Department of Surgery at the University of Genoa, Italy, presented a paper at one of the surgical staff conferences on the syndromes resulting from dilatation of normal arteriovenous shunts in the lower extremity. At another staff conference, Dr. Emilio Etala of Buenos Aires discussed the technique of total gastrectomy and Dr. Vojislav Stojanovic of Belgrade, Jugoslavia, discussed the technique of pericardectomy.

On October 11 an operative and dry clinic were arranged for forty members of the Society of Clinical Surgery. On January 23 the Allen O. Whipple Society met in Philadelphia with sixty-one graduates of the department present, and on April 11 the annual alumni-day program attracted forty-two alumni of the surgical service of the Presbyterian Hospital.

The department was represented at over twenty out-of-town meetings, including the meeting of the International Surgical Society in Mexico, the International Congress of Clinical Pathology in Brussels, the International Symposium on Breast Cancer in Perugia, Italy, the International Tissue Culture Conference in Glasgow and the International Congress for Cell Biology in St. Andrews, Scotland. At all of these, papers were presented by members of the department in addition to over thirty presentations to local and national societies. Eighty-two papers were published during the year.

Honors and elections to office came to many members of the department. Professor Arthur Purdy Stout was awarded the James Ewing Medal of the James Ewing Society. Professor Frantz was given the Elizabeth Blackwell Citation of the New York Infirmary. Professor Deterling was elected treasurer-general of the International Cardiovascular Society; Professor Blake-more was elected president of the American Society for Vascular Surgery; Professor David Habif was elected secretary-treasurer of the Halsted Society;

Dr. Philip Wiedel served as chairman of the Committee on Admissions to the New York Academy of Medicine; and Professor George H. Humphreys served as chairman of the Conference on Cardiovascular Surgery arranged by the New York Heart Association in January.

Urology

EXECUTIVE OFFICER: Professor John K. Lattimer

The department has made additional progress in improving its teaching methods and in advancing its integration into the broad, functional pattern of the Medical School. This has been greatly aided by the streamlining of clinical facilities and the expansion of laboratory activities. The latter has been accomplished not entirely by the acquisition of new space, but also by more efficient utilization of the space already available. Professor Meyer Melicow, our specialist in urological pathology, now works more closely with the division of surgical pathology in the performance of routine tissue analyses. There has been some sharing of space in the surgical animal laboratories and two ultrasonic research projects have been housed in the School of Engineering for their cooperative prosecution in conjunction with Professor Lawrence H. O'Neill of the Engineering faculty.

Closer integration with the Department of Radiology has brought some new problems within the sphere of this department and additional space has been made available in the Atomic Energy Commission's laboratories for a project in intracavitary irradiation of bladder tumors. Additional projects have been started in the urological and bacteriological laboratories of Professor Harry Seneca. The patient sample for clinical research in tuberculosis and in kidney stone disease has been expanded by the cooperation of additional outside hospitals and it has been our good fortune to have one visiting fellow from the Staten Island Public Health Hospital with us to tell of his experiences with the artificial kidney and to aid in our pediatric research program. The department has been fortunate in having Dr. Stanley Braham, one of our former residents, return to the department. He has greatly aided the undergraduate teaching program and the clinical research projects, most notably the project with Dr. Harold Lamport of Yale University on the ultrasonic destruction of kidney stones.

Miss Cornelia McCoy, formerly in charge of the Squier X-ray Clinic, has brought order to our study of congenital anomalies on the urologic ward of the Babies Hospital. Working with Dr. Donn E. Leuzinger and Dr. Aurelio Uson, she has continued to contribute to the advances made in these studies.

Work over the past two years on cryptorchid children is slowly reaching fruition under the direction of Dr. Clement Furey and Dr. Robert Wickham, former residents here, who with Mrs. Stock, Miss Meyer, and Mrs. Chappell have codified treatment regimens.

There is available in the department, the testicular biopsy material accumulated by Professor John N. Robinson and the late Professor Earl T. Engle of the Department of Anatomy over twenty years ago, which will be invaluable in estimating the prospects for fertility in this condition.

Continuing clinical studies of the voiding efficiency of children have been carried out. Dr. Archie L. Dean has concentrated on roentgenological methods, and Dr. Leuzinger has improved cystometrograms and uroflowgrams with a flow-meter which measures the rate of escape of urine from the bladder. Dr. Myron Roberts has used a floating radiopaque agent to measure the completeness of voiding.

In the field of tumor study and chemotherapy, Professor Melicow, Dr. Uson, and Professor Perry B. Hudson's group continue their activity both on clinical and basic levels. Under the direction of Professor Hudson, the cancer research laboratories of the department, both in the College of Physicians and Surgeons and the Francis Delafield Hospital, have been utilized in basic studies of steroid biochemistry, enzymology, and nucleic acid chemistry. At the professional level the group includes Professor T. Duane Price and Drs. Michael E. Lombardo and Rosemarie Bauer.

The steroid biochemical group has studied the metabolism of cortisone acetate in an adrenalectomized male patient with one testis. The major metabolite of cortisone isolated was 17 α ,20B,21-trihydroxy- Δ^4 -3,11-dione (9.5 per cent). This is the first report of isolation of this substance from human urine. Other metabolites of cortisone isolated were tetrahydrocortisone (2.07 per cent), cortisol (0.15 per cent), 3 α , 11B-dihydroxyetiocholan-17-one (0.07 per cent), and 3 α -hydroxyetiocholan-11, 17-dione (0.09 per cent).

Studies on the ability of normal human testicular tissue to utilize progesterone as a precursor for human androgen biosynthesis were continued. The use of C¹⁴-labeled steroids has been continued in an attempt to investigate the role played by the bile in the excretion of steroid metabolites.

Study of metabolism of the nucleotides and nucleic acids of bacteria, in laboratory animals and man, has continued. In collaborative studies with Professor Stephen Zamenhof of the Department of Biochemistry, investigations of a thymine-requiring strain of *E. coli* have provided information on the mechanism whereby 5-bromouracil (an analogue of thymine) can enter desoxyribonucleic acid (DNA) of this organism and replace part of the thymine normally present there. Investigation of rates of renewal of phosphorus of small-molecule nucleotides, ribonucleic acid (RNA) and DNA of incubated slices of surgically-exercised human organs has continued.

In an attempt to find a more nearly satisfactory and more frequently successful means of reconstructing the contracted vesical neck which sometimes

results from previous surgery, a technique was adapted which employs a full thickness flap of anterior bladder wall to make up part of the vesical outlet.

Our investigations in the field of enzyme catalysis and denaturation have led to a kinetic theory to help explain thermal denaturation and a portion of the enzyme surface of prostatic acid phosphatase has been mapped.

In a continuing study of the enzymes of the human erythrocyte, the method of purification and the properties of phosphoglucose isomerase have been described. Although the isolated product had a calculated turnover number of approximately 30,000, it was not yet pure and efforts at further purification are being made.

Dr. Timothy Donovan presented a paper on tumors of the testis, at the University of Vermont in November, 1957, and Dr. Dean a paper on hematuria at the Bronx County Medical Society in April, 1958.

Dr. Dean, with Professor Zinsser, has commenced work on a new operative approach striving for cure of prostatic cancer, utilizing complete removal of the pubic bone which overlies the prostate gland. The hope is that this will provide improved exposure and make more advanced cancers amenable to therapy with less mutilation.

Professor Zinsser, with Miss Wolff and Professor G. Failla and Dr. William A. Gross of the Department of Radiology is exploring the uses of short-range beta-emitting isotopes in bladder papillomatosis.

In the field of interstitial cystitis, meetings of a combined study group comprising specialists from a variety of fields outside of urology were held, in an effort to find a new and significant approach to this complex and debilitating disease. Professor Michael J. Lepore from the Department of Medicine, Professor Robert A. Senescu from the Department of Psychiatry, Professor James B. Campbell from the Department of Neurological Surgery, and Dr. John E. Bowers and Professor John K. Lattimer of the Department of Urology have led these discussions. Some interesting observations have been supplied by Chaplain Robert B. Reeves.

In the field of urological infections, Professor Seneca has made an extensive study of the septicemias due to aero-bacter serogenes and has continued sensitivity studies of both pyogenic and acid-fast organisms. He has embarked with Professor Zinsser, Mr. Thomas J. Arouni, and Miss Antoinette Abrams on a study of the effect of metacorticoids in experimental chronic pyelonephritis. He is investigating less toxic sterilizing agents for urological instruments, and continues his studies on hyaluronic acid. He has made a study of factors causing mutation in bacteria of clinical importance on our service.

In the field of tuberculous infections of the kidney Professor Lattimer, with Dr. Truman Boyes, Professor Zinsser, Mrs. Sally Montebello, and Mrs. Grace V. DePlanche, worked in close conjunction with Dr. Herman Weschler of the Veterans Administration Hospital in the Bronx and Dr. Dudley Miller in continuing their study of chemotherapy in genito-urinary tuberculosis.

In February, 1958, Professor Lattimer gave the annual report of the government conference on the chemotherapy of tuberculosis before the com-

bined meeting of the Veterans' Administration, Army and Navy representatives, at Memphis, Tennessee. A summation of the data showing the comparative effectiveness of all new anti-tuberculosis drugs in regard to kidney tuberculosis was presented. An evaluation of modern chemotherapy for kidney tuberculosis was also given at the New York Academy of Medicine, Medical Circle Meeting in December of 1957 and again before the New York Meeting of the American College of Surgeons on March 6, 1958. Two additional presentations of this material were given before the American Association of Genito-Urinary Surgeons at Biloxi, Mississippi, and before the New York State Medical Society meeting in New York City in May, 1958. A paper on the therapy of kidney tuberculosis in children, was delivered at the invitation of the American Academy of Pediatrics at their spring meeting at the Hotel Statler in New York City in April, 1958.

Three new anti-tuberculosis drugs are being tested by the research group for genito-urinary tuberculosis. Since this research unit, in cooperation with the Research Unit at the Veterans Administration Hospital, in the Bronx, provides the largest source of information on this subject in the United States, this work is of some importance.

The calculus disease study group initiated by Dr. Ralph J. Veenema and Professor Zinsser has been greatly expanded and its activities increased during the course of the past year. A review was made of the urological aspects of all patients operated for parathyroid adenoma at the Medical Center, and the addition of pediatric stone patients with calculus disease to those already studied at the Los Angeles County General Hospital and the Children's Hospital in Los Angeles. This work has been carried out primarily by Dr. Veenema with the aid of Mrs. DePlanche. Biochemical work on the stone problem has proceeded under the direction of Professor Zinsser with the help of Mrs. Montebello, Professor Zacharias Dische, and Dr. Joel A. Dain. These studies have been centered on urinary mucopolysaccharides in normal and stone-forming patients, and correlary work has been entered into with Dr. C. Andrew L. Bassett of the Department of Orthopedic Surgery. The clinical laboratory on the tenth floor of the hospital has been cleared to do routine determinations, such as paper chromatography and various urinary determinations of importance in the study of the metabolic aspects of stone formation. This is at present under the direction of Mrs. Winocour. The nature of metal amino acid and metal carbohydrate complexes is being investigated by x-ray diffraction techniques by Mr. Isaac Sarfati. Studies on oxalate metabolism, cystine metabolism, and uric acid metabolism are at present being conducted on the clinical level. Mr. Tom Arouni is investigating the formation of calcareous deposits about various plastics in the presence of urinary tract infection and methods of preventing them. The study of stone patients has been extended to include several other hospitals to raise the patient census for statistical analysis of significant groups.

Various electronic methods of analyzing sperm motility and sperm progression are under way with the help of Mr. David Miller and Mr. Thomas

Chase, under the direction of Professor Zinsser. Work in the outpatient department under the direction of Dr. Frederick S. Dick has been expanded into a retrospective case study, carried out with emphasis on correlation with the female-fertility clinic so ably run by Professor Anna L. S. Southam of the Department of Obstetrics and Gynecology. Mrs. Mary E. Jursch and Mrs. Mary Lindberg have been invaluable in the prosecution of this work.

Medical-student teaching has undergone expansion in the past year with greater emphasis being placed on outpatient clinic study of selected problems, a gradual shift of emphasis away from the review papers previously required in the course, and the evolution of a provocative examination for the students at the completion of the course. Greater outpatient teaching space is badly needed for adequate demonstrations and active participation of the students in the clinic.

The training of residents and postgraduate fellows continues to increase, with greater research emphasis on all phases of the residency and the addition of weekly bacteriology rounds. Basic vascular surgery is now taught to all urological residents in the animal laboratories. The emphasis on growths and microscopic pathology continues unabated but greater laboratory coverage within the framework of the residency has been achieved by the increase in staff. The prosecution of at least two research projects in the course of the residency is now routine and a great deal of excellent case study work already has resulted. The studies at present underway by the resident staff include studies in genito-urinary tuberculosis by Dr. Truman Boyes, with particular emphasis on patients with unoperated severely damaged single kidneys; long-range results of therapy in female pseudohemaphrodites by Dr. Philip Jensen; study of cases of bladder tumor treated by total cystectomy by Dr. Myron Roberts; concomitant cases of bladder tumor and suprapubic prostatectomy by Dr. Robert J. Pletman; study of uric acid stone patients by Dr. Frank W. Longo; and concomitant bladder tumors in diverticula by Dr. Sam T. Knappenberger. Dr. Leuzinger has spent much of his time in analyzing congenital urologic abnormalities in children with Miss McCoy and has done a great deal to make the measurement of bladder muscle potential more accurate in the infants. Considerable interchange of information was made possible by the alteration of Dr. John B. Lawlor and Dr. Pletman between the Delafield Hospital Service and the Presbyterian Hospital Service in the course of the last half of the year. It is anticipated that additional resident fellows will come to train with us from the Staten Island Public Health Hospital and it is hoped that a full-time fellow both in renal tuberculosis and in fertility may be added to the staff in the coming year.

In the field of postgraduate education four exhibits were presented by various members of the department at the Western Section of the American Urological Association in Palm Springs, California, in February, 1958, at the Fifty-third Annual Convention of the American Urological Association in New Orleans, Louisiana, in May, 1958, and at the New Jersey Medical Society annual meeting in May, 1958.

Texts and review articles were written or are in progress by Professor Melicow and Dr. Uson for Dr. George Pack's volumes on cancer; Dr. Harold A. Lamport of Yale University School of Medicine and Professor Zinsser on renal circulation for the *Encyclopedia of Cardiology*; by Professor Zinsser in *Treatment of Genito-Urinary Lithiasis*; on cystinuria and on neurogenic bladder in the treatment of trauma in the central nervous system, edited by Arnold M. Mierowsky; and by Professor Lattimer on treatment of prostatic hypertrophy in Merck Manual.

Professor Lattimer has continued his work on the functional closure of exstrophy of the bladder and participated in a discussion of this subject before the American College of Surgeons meeting in New York in March, 1958. At this same meeting he also presented a paper on congenital deficiency of abdominal musculature with associated genito-urinary anomalies, a report of twenty-four cases, and a second paper on the treatment of renal tuberculosis. He also delivered a lecture on the roentgen diagnosis of adrenal lesions, before the New York Society at the New York Academy of Medicine in October, 1957. He delivered an additional paper on the treatment of abdominal tumors in children, before the annual meeting of the Columbus Hospital staff in New York City in September, 1957.

Speeches were given to graduate medical groups by Dr. Veenema in the panel on urological therapy at the New York Academy of Medicine: by Professor Hudson, on factors influencing radical prostatectomy and on surgical attempt to remove all tissue to remove prostatic cancer; by Dr. J. Timothy Donovan on testis tumors, presented at the University of Vermont; by Professor Zinsser at the International Gerontological Congress in Metano, Italy, on electrical analogues for vascular aging, at the University of Madrid, on modern treatment of uremia, and in Huntington, West Virginia, on genito-urinary infections and renal function. He also discussed a paper on cystinuria at the western section of American Urological Association at Palm Springs, California.

Members of the department published many papers during the year and were appointed to various outside positions. Professor Fish continued the post as treasurer of the New York Medical Society. Professor Lattimer participated in the activities of the American Urological Association and the Association of Genito-Urinary Surgeons. He was chairman of the Section on Genito-Urinary Surgery of the New York Academy of Medicine and vice-president of the Association for Pediatric Urology. Professor Zinsser was chairman of the New York Professional Group on Medical Electronics of the IRE and the Clinical Chemistry Committee of the American Chemical Society. Dr. Veenema served as president of the Urological Section of the New Jersey State Medical Society.

Medical Library

MEDICAL LIBRARIAN: Professor Thomas P. Fleming

Fourteen years ago we presented plans for a new library which would be adequate for our purposes and would provide for anticipated growth, hopefully for the next twenty-five years. We thought our situation to be desperate in 1944 because we had 125,000 volumes. In 1958, with an estimated stock of 225,000 bound volumes (plus 100,000 unbound issues of journals), we now describe our situation as frightfully disturbing.

Our situation is the result of medicine itself. We are required to feed ideas and information to a voracious group of dedicated medical scientists eager to extend the frontiers of medical knowledge, to impart existing knowledge to other would-be medical scientists, and to apply the principles of what is known to those patients requiring their services. No matter how carefully we select new publications, no matter how ruthlessly we discard older publications, our growth continues inexorably at a rate of about 8,000 bound volumes a year. With the shelves filled to overflowing and new volumes of the standard journals pouring in, each year we have to move another 10,000 volumes to the Butler Library on 114th Street. Offhand this looks like a happy solution to our problem—get rid of the lesser-used publications.

We do have publications which fall into the lesser-used category, and their continued housing presents a problem. That same problem confronts other medical libraries in the New York area. This spring a Conference on Co-operation between Medical Libraries in the New York Area was held to investigate the possibility of cooperative housing and sharing of resources through loans. This preliminary step looks promising and may ultimately provide a partial solution to our problem.

During the year Erich Meyerhoff, medical reference librarian since 1952, resigned to accept the position of librarian of the State University of New York, Downstate Medical Center, Brooklyn. Harold Bloomquist, a member of the staff since 1951, was named to succeed him. Virginia Sperl, medical cataloging librarian since 1952, resigned to accept a similar position with the Albert Einstein College of Medicine. She has been succeeded by Phyllis Dain, cataloger since 1953 for the Columbia University Libraries.

In an effort to hold down the costs of operation, and at the same time to increase the efficiency of service, the professional members of the reference department aided by a dozen graduate students in medical librarianship have

been conducting a study of the adequacy of indexing of monographic serials by standard current bibliographic services. Preliminary investigation leads us to the conclusion that analytics by individual libraries may well be eliminated at a considerable saving. The detailed study is now being worked into shape for publication.

During the past year forty-three students took the courses in medical librarianship given under the auspices of the School of Library Service and conducted by Professor Fleming. The second edition of his *Guide to the Literature of the Sciences* was published, and a revision of his *Guide to the Literature of the Medical Sciences* is in preparation. Instruction in the use of the literature of various subjects was given by members of the Library staff to twenty different groups in the Schools of Medicine, Dentistry, Nursing, and Public Health and Administrative Medicine.

It is a pleasure to report the continued support of the Library by gifts and contributions from its many friends. Dr. Jerome P. Webster, continuing his past generous gifts, gave funds for the purchase of publications in the field of plastic surgery.

The Medical Library suffered a great loss in the death of Professor Earl T. Engle on December 16th. He was chairman of the Library Committee for a number of years and had been a member since the opening of the Medical Center in 1928. His wise counsel will be missed.

Our sole purpose is to provide the best service designed to meet the functions of the Columbia-Presbyterian Medical Center. Right now we desperately need help in the form of adequate facilities. If we don't get them soon we are going to be a millstone around the neck of this Medical Center.

Willard C. Rappleye, M.D.

DEAN

June 30, 1958

COLUMBIA UNIVERSITY LIBRARIES



0050075942

